BACHELOR THESIS – ME 141502

ECONOMIC ANALYSIS OF KM MINA JAYA NIAGA LONGLINER SHIP CONVERSION TO FISH CARRIER SHIP

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DOUBLE DEGREE PROGRAM OF
MARINE ENGINEERING DEPARTMENT
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SKRIPSI – ME 141502

ANALISIS EKONOMI KONVERSI KM MINA JAYA NIAGA *LONGLINER SHIP*MENJADI KAPAL PENGANGKUT IKAN

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APPROVAL FORM

ECONOMIC ANALYSIS OF KM MINA JAYA NIAGA LONGLINER SHIP CONVERSION TO FISH CARRIER SHIP

BACHELOR THESIS

Proposed to Fulfill One of The Requirements for Obtaining a Bachelor Engineering Degree
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Study Program Bachelor Double Degree of Marine Engineering Department
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SURABAYA
July, 2017

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Department : Double Degree Program in Marine Engineering

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ECONOMIC ANALYSIS OF KM MINA JAYA NIAGA LONGLINER SHIP CONVERSION TO FISH CARRIER SHIP

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ABSTRACT

KM. Mina Jaya Niaga is an asset that belongs to PT. IKI as one of Indonesian State Owned Enterprises according to Letter of Directorate General of Treasury Ministry of Finance Republic of Indonesia number S-3715/MK.6/2006 at 20 June 2005.There are 14 ships unit that had been completed and 17 ships set unit. Around 14 ships unit that had been completed, 2 units operated by PT. Perinus, 8 units are heavy damage and 4 units operated with minor repair. Therefore, it has been a terrible condition for KM Mina Jaya Niaga and need immediate decision to tackle the problems. Because of the restriction rules and to optimized the operational, KM Mina Jaya Niaga would be operated as a conversion from longline shipto fish carrier ship. On this thesis will be discussed about Economic Analysis of KM Mina Jaya Niaga Longliner Ship Conversion to Fish Carrier Ship. This thesis covers economic analysis based on operational pattern of KM Mina Jaya Niaga as fish carrier ship. Operational scenario from KM Mina Jaya Niaga, this fish carrier ship will be operated on WPP-RI 716 with home based port at PP Bitung. KM Mina Jaya will accommodate fish obtained from fishing vessels of with 50 GT on 4 fishing ground with estimated time for 1 voyage 18,92 hours, loading-unloading at PP Bitung 1 day, and time to berth at port 4 days. So, operational time for KM Mina Jaya Niaga is 6 days. Variable financing scenarios are performed to repair, modify and re-operate KM Mina Jaya Niaga as a fish carrier ship. Among them are self-funded by PT IKI as the owner of the vessel or joint funding with several parties. If viewed from an economic point of view, the conversion of KM Mina Jaya Niaga from longliner ship to fish carrier ship is feasible and can be a very profitable business.

Keywords :Economic analysis, Conversion, Fish carrier ship.

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ANALISIS EKONOMI KONVERSI KM MINA JAYA NIAGA *LONGLINER SHIP* MENJADI KAPAL PENGANGKUT IKAN

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ABSTRAK

KM Mina Jaya Niaga adalah aset milik PT IKI sebagai salah satu Badan Usaha Milik Negara (BUMN), menurut Surat Keputusan Menteri Keuangan Republik Indonesia Nomor S-3715 / MK.6 / 2006 tanggal 20 Juni 2005. Ada 14 unit kapal yang telah selesai dan 17 kapal satuan. Sekitar 14 unit kapal yang telah selesai dibangun, 2 unit dioperasikan oleh PT Perinus, 8 unit mengalami kerusakan berat dan 4 unit dioperasikan dengan perbaikan ringan. Dikarenakan, kondisi KM Mina Jaya Niaga yang sudah sangat buruk dan butuh keputusan segera untuk mengatasi masalah tersebut. Dengan adanyaperaturan pembatasan dan optimalisasi operasionalnya, KM Mina Jaya Niaga akandimodifikasi dari kapal penangkap ikan menjadi kapal pengangkut ikan. Pada tesis ini akan dibahas tentang Analisis Ekonomi Konversi Kapal Longliner KM Mina Jaya Niaga menjadi Kapal Pengangkut Ikan. Tesis ini mencakup analisis ekonomi berdasarkan pola operasional KM Mina Jaya Niaga sebagai kapal pengangkut ikan. Skenario operasional KM Mina Jaya Niaga sebagai kapal pengangkut ikan, akan dioperasikan di WPP-RI 716 dengan pelabuhan di PP Bitung. KM Mina Jaya akan menampung ikan yang diperoleh dari kapal penangkap ikan kapasitas 50 GT di 4 titik tangkap ikan dengan perkiraan waktu untuk 1 pelayaran 18,92 jam, bongkar muat di PP Bitung 1 hari, dan waktu untuk bersandar di pelabuhan 4 hari. Sehingga total waktu operasional KM Mina Jaya Niaga adalah 6 hari. Skenario variabel pembiayaan dilakukan untuk memperbaiki, memodifikasi dan mengoperasikan kembali KM Mina Jaya Niaga sebagai kapal pengangkut ikan. Diantaranya didanai sendiri oleh PT IKI sebagai pemilik kapal atau dilakukan kerjasama dengan beberapa pihak. Jika dilihat dari sudut pandang ekonomi, konversi KM Mina Jaya Niaga dari kapal longliner menjadi kapal pengangkut ikan layak dilakukan dan bisa menjadi bisnis yang sangat menguntungkan.

Kata Kunci : Analisis Ekonomi, Konversi, Kapal pengangkut ikan.

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PREFACE

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CHAPTER 1
INTRODUCTION

1.1 Background

KM. Mina Jaya Niaga is an asset that belongs to PT. IKI as one of Indonesian State Owned Enterprises according to Letter of Directorate General of Treasury Ministry of Finance Republic of Indonesia number S-3715/MK.6/2006 at 20 June 2005. There are 14 ships unit that had been completed and 17 ships set unit. Around 14 ships unit that had been completed, 2 units operated by PT. Perinus, 8 units are heavy damage and 4 units operated with minor repair. Therefore, it has been a terrible condition for KM. Mina Jaya Niaga and need immediate decision to tackle the problems.

Circular letter from Ministry of Maritime and Fisheries Affairs number B.1234/DJPT/P.I410.D4/31/12/2015 about restriction of Ship's Gross Tonnage size on SIUP/SIPI/SIKPI, which is Fish Carrier Ship restricted to 150 Gross Tonnage. Meanwhile, size of KM. Mina Jaya Niaga is 512 Gross Tonnage. That's one of factor that made KM. Mina Jaya Niaga couldn't be operated (PT PANN, 2016).

Because of the restriction rules and to optimized the operational, KM. Mina Jaya Niaga would be operated as a conversion from fish carrier to mother ship. Where mother ship would be placed in small islands that have high potential to fish catching. Therefore, fisherman could go fishing without worries about the supply of logistics such as fuel and ice.

In addition, recommendation is needed to optimize used of KM. Mina Jaya Niaga for fisherman near small islands. A recommendation that been given is conversion of KM Mina Jaya Niaga from fishing vessel to carrier ship, reviewed on operational aspect.

1.2 Statement of Problems

From the explanation above, so the main problem will be discussed are as follows:

- How is the operational scenario for KM Mina Jaya Niaga as fish carrier ship?
- How is variable of financing for KM. Mina Jaya Niaga as fish carrier ship?
- How is the economic feasibility for KM. Mina Jaya Niaga conversion from fishing vessel to fish carrier ship?

1.3 Scope

The stated scopes of this study are:

- Reviewing KM Mina Jaya longline ship.
- Carrier ship will be placed on Sulawesi Sea.
- References of this thesis based on data from PT. IKI, government regulations, company's data, quitionaries.

1.4 Objectives

The objectives of this study are to:

- Define operational and investment scenario for operating KM Mina Jaya Niaga as carrier ship.
- Indentify capital carrier expenditures and operation costs of Mina Jaya as carrier ship.
- Determine the economic feasibilityof KM Mina Jaya Niaga conversion from fishing vessel to carrier ship.

1.5 Benefits

The benefits of this study are:

- Could provide recommendations about ship conversion to related parties and government.
- Obtain the result of feasibility study in KM Mina Jaya Niaga conversion from fish carrier to mother ship, reviewed on technical, operational and economy factors.

CHAPTER 2
Literature Review

2.1 General

PT Pengembangan Armada Niaga Nasional (PT. PANN) is a executing agency of KM Mina Jaya Niaga by document Minister of Finance No. S-493/MK.016/1994 at 30 June, 1994. PT. PANN has received 31 shipset material of ship from Spainand assembled by PT Industri Kapal Indonesia (PT IKI). From 31 shipset that has been received,14 ships were resolved and 17 units are still in the form of shipset. 14 ships that already completed are not able to be absorbed by the market as the price and rents are high.

Based on document No. S-117/MBU/2005 at22 March 2005 that released by Ministry of State Owned Enterprises regarding ofKM Mina Jaya Niaga transfer assets, 17 shipsets and 14 ships that parked in the area of shipyard PT IKI. Approval stated by Ministry of Finance through letter GG Treasury No. S-3715/MK.6/2006 date June 20, 2005 including:

1. The transfer of the KM Mina Jaya Niaga assets of PT PANN to PT IKI as of April 1, 2005.
2. Loan closing SLA PT. PANN and loans issued between the government and the PT. IKI.

From 14 ships that have been completed, 2 units have been operated by PT Perikanan Nusantara (PT. Perinus) in agreement at April 24 and November 3, 2014. 12 units remaining of KM Minajaya Niaga that parked in shipyard area of PT IKI with conditions 8 units are severely damage and 4 units can be operated with minor repairs. If KM Mina Jaya Niaga is still abandoned in shipyard area in PT. IKI, it could worse the condition of KM Mina Jaya Niaga condition. Therefore, empowerment of KM Mina Jaya Niaga is considered as very important to provide benefits to the economy society and also able to clean the commercial area of PT. IKI.

Empowerment process of KM Mina Jaya Niaga obstacle is the licensing of the operation. The latest issuance of rules / regulation from Ministry of Maritime Affairs and Fisheries (KKP) aboutPermit of Fish Boat Transportation (SIKPI) or its extension can only be issued to the vessel in accordance with the names listed in Grosse Deed of ship. KM Mina Jaya Niaga that belongs to PT. IKI, became difficult to leased or operated by other users. In addition it became more troubled, with the publication of the circular KKP No. .B1234/DJPT/P.I410.D4/31/ 12/2015 on the GT vessel size restrictions in the issuance of new SIUP/SIPI/SIKPI for fishing vessel not more than 150 GT. As for

the size of the KM Mina Jaya Niaga is the 512 GT. It makes KM Mina Jaya Niaga is unable to operate (PT PANN, 2016).

2.2 General Data

2.2.1 General Conditions of Sulawesi Sea

Celebes Sea is located on the west of Pacific Ocean. This ocean basin has a depth of 6200m. It extends 420 miles (675 km) north-south by 520 mi (840 km) east-west and has a total surface area of 110,000 square miles (280,000 km2) (Wikipedia,2017). Figure 2. 1will show where Celebes Sea lies bordered by Sulu Archipelago, Sulu Sea and Kalimantan.

Figure 2. 1 Condition of Sulawesi Sea[1]

The tropical setting and warm clear waters of Celebes Sea makes it a decent habitat for corals, whales, dolphins, and many kinds of pelagic species. This condition also increases the potential of pelagic-fish catch in Celebes Sea especially tuna.

Fish catches in North Sulawesi are dominated by the fisherman whose their boat is using huhate as a fishing rod. As shown inFigure 2. 2, area of fisherman that using huhate is fishing ground at Sulawesi Sea and Maluku Sea (Nugraha, B. & E. Rahmat, 2008).

[1] Wikipedia, 2017

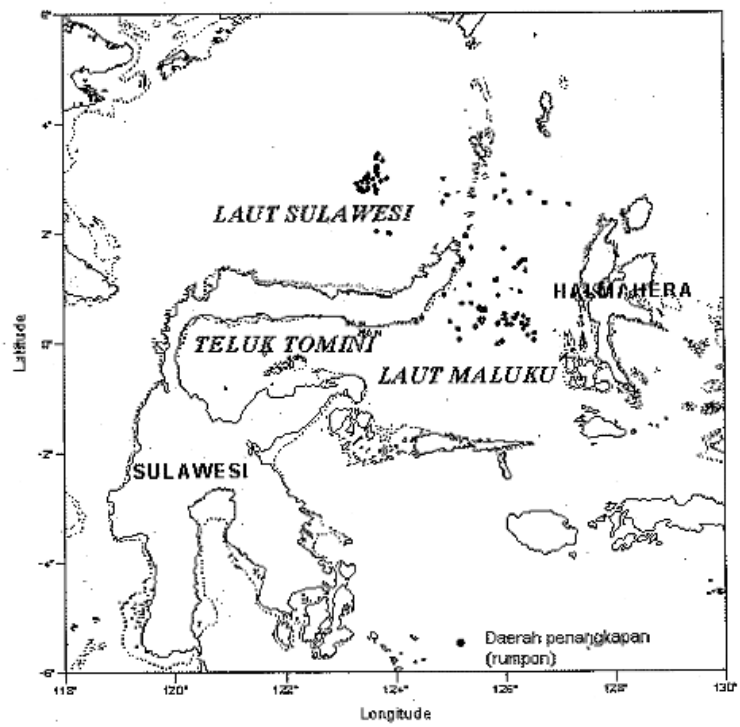

Figure 2. 2 Fishing Ground on Sulawesi Sea and Maluku.

2.2.2 Fish Catches

One of the potential of marine resources have long been exploited population is fishery resources. Seafood Indonesia has the sustainable potential of 6.4 million tons per year. The potential for sustainable fishing is the potential that still allows the fish to regenerate so that the amount of fish caught will not reduce the fish population.

Based on international regulations, the allowable catch was 80% of the sustainable potential or approximately 5.12 million tons per year. In fact, the number of fish caught in Indonesia reached 5.4 million tons per year. This means there are still opportunities to increase the allowable catch, which amounted to 720,000 tons per year. If we compare the potential distribution of the fish, it appears the general differences between Western and Eastern part of Indonesia. In the western part of Indonesia with an average depth of 75 meters, the type of fish that many dtemukan is small pelagic fish. Rather different conditions contained in the eastern part of Indonesia that the depth of the sea reaches 4,000 m. In eastern Indonesia, is found in large pelagic fish such as tuna and skipjack tuna.

To know The Allowable Catches (TAC) in Indonesia can be seen from Fish Management Area – Republic of Indonesia (WPPNRI). Based on document

No.01/MEN/200 by Ministry of Maritime Affairs and Fisheries, Fish Management Area – Republic of Indonesia is divided into 11 WPPNRI. Figure 2. 3 shows 11 WPPNRI along Maximum Suistainable Yield (MSY) and The Allowable Catch of each area.

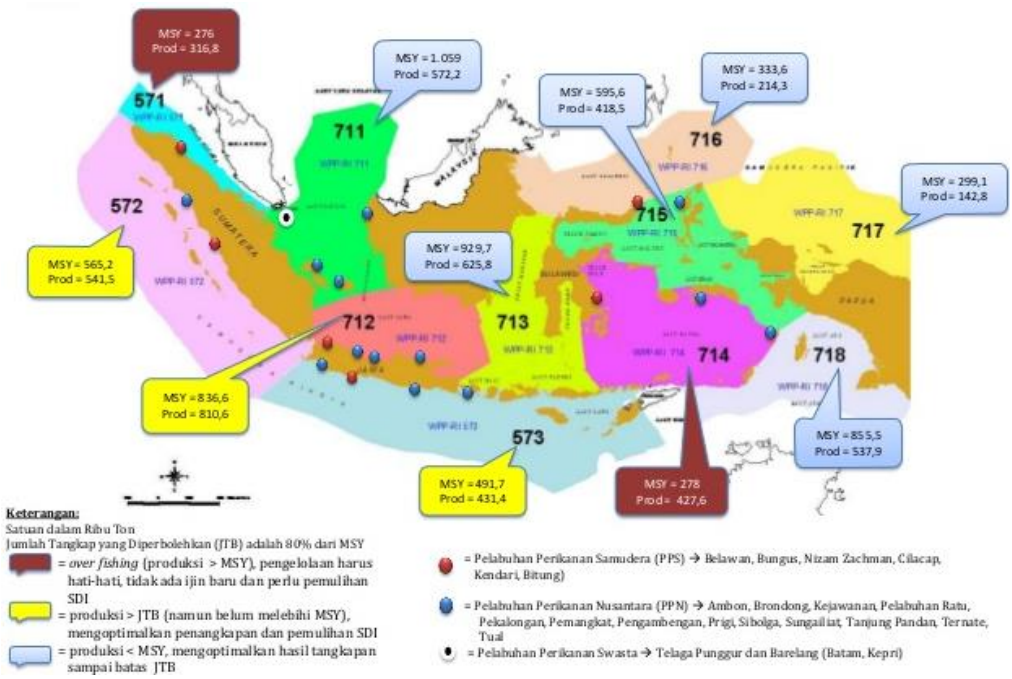

Figure 2. 3Fish Area Management Republic of Indonesia

On this thesis, fishery resources potential will be focusing onFisheries Management Area (WPP-RI) 716. Where WPP-RI 716 includes Celebes Sea and the Northern part of Halmahera Sea. As shown inFigure 2. 3WPP-RI 716 has Maximum Sustainable Yield (MSY) as many as 336.000 tons/year, meanwhile the maximum amount of catch that are allowed are 80% of the MSY or approximately 266.880 tons/year. Table 2. 1shows production rate of big pelagic catches at WPP-RI 716.

Table 2. 1 Statistic of marine capture fisheries production by species in Sulawesi Sea and Nothern of Halmahera Island (WPP-RI 716), 2011-2015[2]

Species	Year				
	2011	2012	2013	2014	2015
Tuna (Albacore, Madidihang, Bigeye)	8228	8045	9619	12795	5188
Skipjack Tuna	21760	28108	28626	38421	42720
Tongkol (Tongkol abu-abu, lisong, kenyar)	41950	54518	92399	108547	79300
Another big pelagic	5343	8163	9098	7045	5802
Jumlah	100408	124352	166068	209616	199172

From the table above, we can see that the production rate of Tuna increases on the average of 24,33% per year.The production rate of Tongkol increases on the average of 16,92% per year, mean while for the production rate of another big pelagic increase 20,17% per year and for Skipjack Tuna it increases about 14.96% per year.

From the data shown in Table 2.1 can be used as a reference to determine the Total Allowable Catches (TAC) in WPP-RI 716 for skipjack tuna, which is 124290,84 tons / year.

The peak of the skipjack tuna fishing season in eastern Indonesia generally occurs during the transition season 1 (April to June) up to the beginning of east season(Uktolseja et al, 1991).

2.3 Type of Fishing Vessel

In general fishing vessels defined on several types, such as fishing vessel, fish carrier vessel and patrol vessel. The definition between fishing vessel, carrier vessel and patrol vessel is :

- Fishing vessel: Fishing vessel is a ship constructed and used specifically only for catching fishes that appropriate with its catching gear and catching technique that will be used for save, hold and preserve.
- Carrier vessel: Carrier vessel is a ship that carries catched fishes equipped with special hatch that used for saving, holding and preserving catched fishes.

[2] Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries. (2016) *Marine Capture Fisheries Statistics by Fisheries Management Area of Republic of Indonesia 2005-2015.*

- Patrol vessel: Patrol vessel is a ship that spesifically constructed for activities concerning controlling and patrolling fishing vessels.

In this thesis will be disscuss about conversion of KM Mina Jaya Niaga longline ship (fishing vessel) to fish carrier vessel. Where this fish carrier vessel will has home base port in Bitung and will be operated in WPP-RI 716.

2.4 Economic Analysis

It is important to know the parameters before doing an economic analysis to find out whether or not a project is feasible.The aim of this thesis is to examine whether the conversion of KM Mina Jaya Niaga longliner ship into fish carrier ship is feasible by holding on to certain parameters.

Few steps of economic analysis on this project are (Soeharto, 2001) :

a. Cashflow

Cashflowis done throughout the operational years of KM Mina Jaya Niaga. Figure 2. 4 will describes a general graph of the cashflow process.

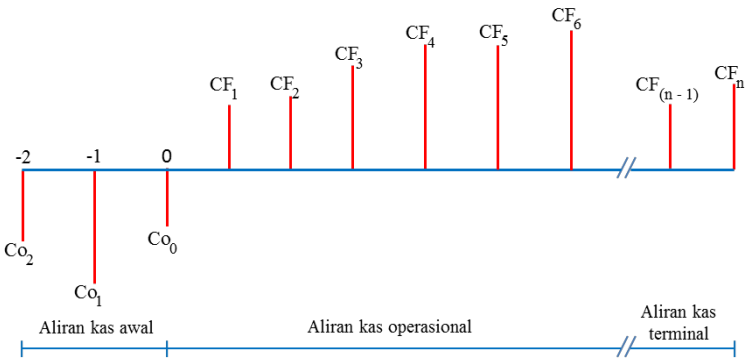

Figure 2. 4 Cashflow diagram[3]

where :

Co = Cash Outflow (investment)
Cf = Cash inflow (revenue, operational cost, maint. cost, etc)
n = Investment year (project)

Cost analysis is conducted to recommend a cost estimate that will be used by a company on their scenarios. Cost analysis that will be conduct includinginitial cost, operational cost and terminal cost (Stopford, 2009) :

1) *Initial Cost*

Initial cost or initial investment on each scenario.Initial cost includes Capital Expenditure (CAPEX),is a budget allocation for purchase, repair,

[3]Soeharto, I. (2001). *Manajemen Proyek (dar konseptual hingga operasional) Bagian II: Kelayakan Proyek dan Keputusan Investasi.* Jakarta : Erlangga.

replacement, or conversionof some equipment which is classified as an asset for a business or company (Masyhuri Hamidi.2003.Jurnal Economic and Business Indonesia).

Budget allocation includes several considerations, one of them is where the capital investment that is used for equipment purchasing, repairment, replacement or conversion comes from. Is it from their own capital or having loan from the bank, this definitely affects the financial sustainability of this project.

2) *Operational Cost*

Operational Cost estimated operating costs or Operational Expenditure (OPEX), is budget expended to finance the operations of a business or company.Operational Expenditure (OPEX) which is covered by the company is related to which kind of chartering fee selected. The type of boat rental that used in this thesis is bare boat charter. For the funding of bare boat charter, the costs covered by company are as follows:

a.) Fix Cost

Operational costs are all daily cost during vessel's operational time and non-operational time. Fixed cost consists of some cost components such as crew salary, crew assurance, and the ship's lubrication. This cost includes maintenance cost but not dry-docking fee and fuel consumptions.

b.) Voyage Cost

Voyage Cost are the costs incurred to earn the freight or other voyage revenue. Voyage cost consists of some components such as fish sales, fuel costs, docking at the harbor cost, loading and unloading cost, and etc.

Other than operational and voyage cost, there are several other costs that affect operational cost or Operational Expenditure (OPEX). Those are the costs of docking, administration fee, and ship-chartering fee. Therefore the total of Operational Expenditures can be calculated with the formula :

OPEX = Operational Cost + Voyage Cost + docking fee, administration fee, ship-chartering fee (2.1)

3) *Terminal Cashflow*

Terminal Cashflow consists of salvage value from repayment work capital. To simplify calculation, the salvage value is commonly considered as 0 (zero), but if there will be selling on assets at the end of age of depreciation, then sales tax shall be counted in.

b. Calculation of economic feasibility parameter

There are several parameters to calculate the economic feasibility of a project, such as:

1) Net Present Value (NPV)

Method that used for arranged stock to measure analysis feasibility of project investment. NPV is the difference between investment value and present value with considering time value of money. If NPV > 0, then proposed project could be accepted, meanwhile if NPV < 0 then it will be rejected. Equation 2.2 shown NPV calculation formula :

$$NPV = \sum_{t=1}^{n} \frac{Rt}{(1+i)^t} \quad (2.2)$$

Where,

t : cash flow time.

i : discount rate.

R*t* : net cash flow.

2) Internal Rate of Return (IRR)

An indicator for efficiency level of an investment. IRR is interest rate that will make NPV value considered as zero. Equation 2.3 shown IRR calculation formula:

$$\text{IRR} = i1 + \left(\frac{\text{NPV1}}{\text{NPV1}-\text{NPV2}}\right) x(i2 - i1) \quad (2.3)$$

Where,

NPV1 : NPV value in low interest rate.

NPV2 : NPV value in high interest rate.

i1 : low interest rate.

i2 : high interest rate.

3) Payback Period

Method for calculating how fast investment that has been implemented could return. Equation 2.1 shown payback period calculation formula:

$$\text{Payback Period} = \frac{\text{Total Number of Investments}}{\text{Number of Proceeds}} \text{x 1 Year} \quad (2.1)$$

c. Risk Assessment

Risk Assessment become important because there is an assumption on the calculation. An assumption always have a different risk from the reality. However, risk assessment on this project is not the main purpose of this paper, so it will not be explained in detail.

d. Economic Feasibility Study

A project is determined feasible or not by several factors, one of which is economical factor or variable financing from this project . Decision making on putting investment and variable financing shall be done after some parameters of feasibility. The decision to invest determines which project are selected and how much it costs. After making decision of investment which assessed by NPV, IRR, PI and PP, therefore it will occur with the variable of financing. Variable financing will relate with how and where from this project is funded.

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CHAPTER 3
Methodology

3.1 Methodology Flow Chart

To assist in the implementation of this thesis, it is necessary to make a sequence of method into the terms of reference in the implementation of the tasks of this thesis. This methodology as shown in Figure 3. 1contains steps taken to address the problems of the work of this thesis. Starting from identification of problems to eventually get a conclusion for the working of this thesis.

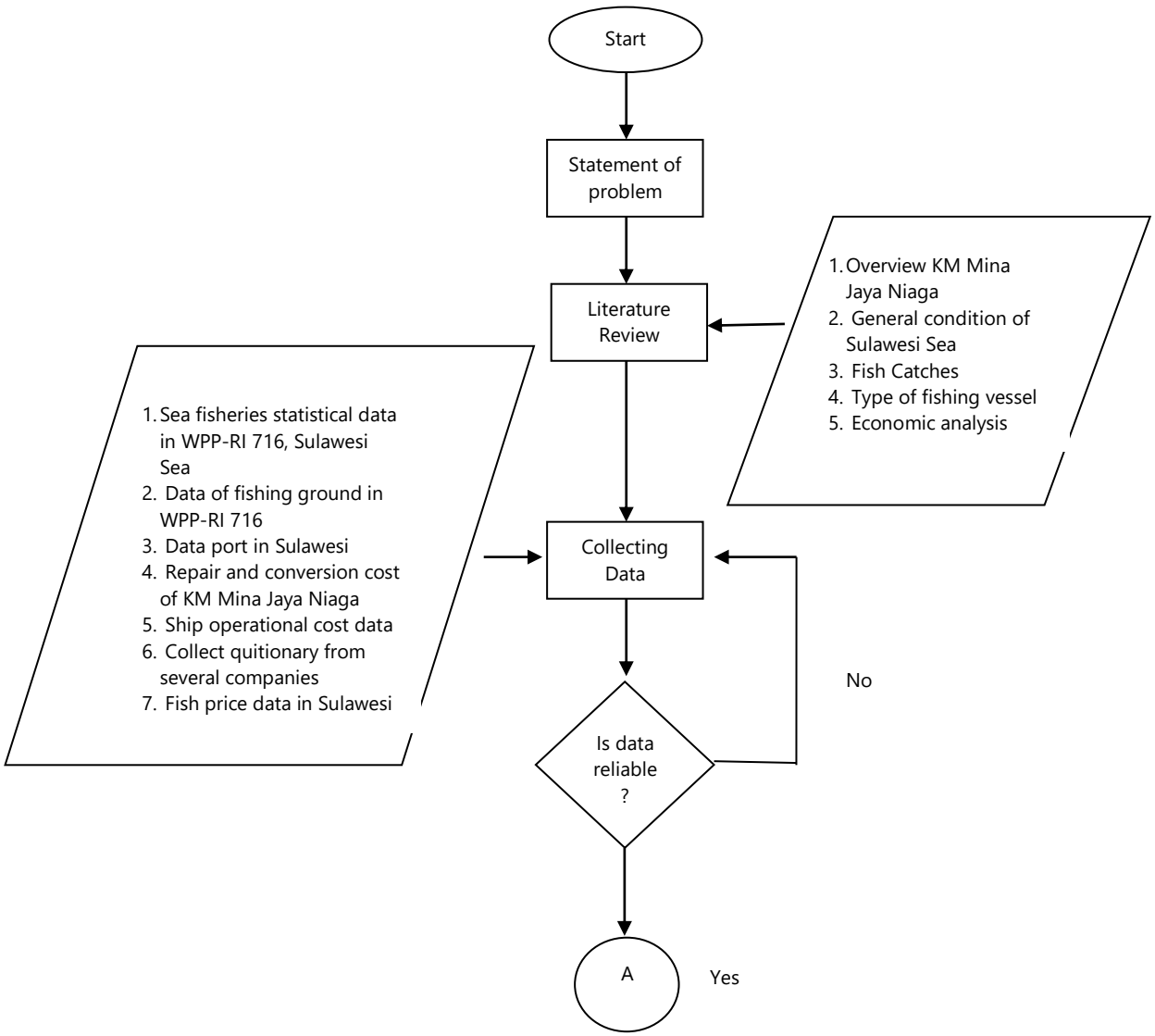

Figure 3. 1Flow chart diagram of Methodology

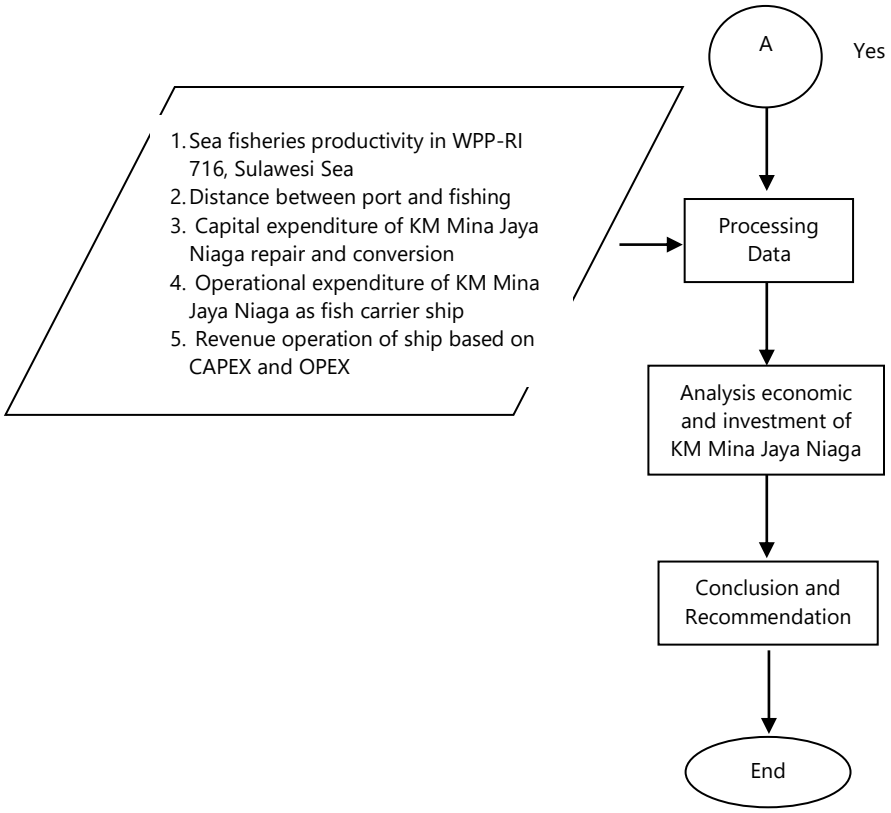

Figure 3. 1 Flow chart diagram of Methodology (continued)

Based on the flow chart above, which provide steps for the completion of this thesis, then the explanation of each points will be explained as below:

3.2 Statement of Problems

Before conducting the research, at first the statement of problems of this study will be explained. Statement of problems are important, because this stage would determine whether the problems is considered as eligible or not.

In this thesis, it has been formulated several problems such as:

- How is the operational scenario for KM Mina Jaya Niaga as fish carrier ship?
- How is variable of financing for KM. Mina Jaya Niaga as fish carrier ship?
- How is the economic feasibility for KM. Mina Jaya Niaga conversion from fishing vessel to fish carrier ship?

Statement of Problems above is exactly the same with the one stated in Chapter 1 point 1.2 and will be used as the input for the next step.

3.3 Literature Review

Literature review is an early stage, about the basic theories to be discussed or used in the study.Literature review is also used to gather information from several sources to provide detailed information regarding the topic of this thesis. Referring to the statement of problems in this thesis, the important points which needs to be reviewed in the literature review are:

- Overview of KM Mina Jaya Niaga.
- General condition of Sulawesi Sea regarding fishing activity.
- Fish catches
- Type of fishing vessel.
- Economic analysis.

Source taken at this stage comes from books, papers, websites, journals, and so forth.Result from the literature review is the material, theory and opinion as the basic to resolve the statement of problems of this thesis.

3.4 Collecting Data

This phase is to obtain information that related to the study. The data that needed on this study are:

- Sea fisheries statistical data in WPP-RI 716 Sulawesi Sea is obtained from e-mail that been sent by Ministry of Marine Affairs and Fisheries Republic of Indonesia.
- Data of fishing ground in WPP-RI 716 is obtained from Ditjen Perikanan Tangkap (DJPT) Ministry of Marine Affairs and Fisheries Republic of Indonesia's website.
- Data of port in Sulawesi to determine the homebase port which will be used in this thesis. Data of port that has been used in thesis is obtained from Ditjen Perikanan Tangkap (DJPT) Ministry of Marine Affairs and Fisheries Republic of Indonesia's website.
- General arrangement of KM Mina Jaya Niaga.
- Repair and conversion cost of KM Mina Jaya Niagais obtained from bachelor thesis that written by Irfan Byna Nur Akbar.
- Ship operation cost is obtained from interview with several fishing companies.
- Fish price data in Sulawesi regionis obtained from interview with several fishing companies.

Some of the supporting data above is obtained by submitting a data request by e-mail, interview, and discussion with some company who are related with this thesis. Interview and discussion is done by answering questions and fulfilling questionnaire that been sent through e-mail. Several questions that has been asked in the questionnaire are:

1. How your company interest if your company is asked to be the operator for KM Mina Jaya Niaga fish carrier ship? (Scale 1 to 10)
2. If your company is asked to give the price rate to rent ABF and cold storage, how much you will rate?
3. If you been asked to buy fish from fisherman and you could sell again as profit, how much you willing to pay from fisherman?
4. How much do you suggest about price range for selling fish?

3.5 Data Processing

In this process, the data obtained will be processed by using the Microsoft Excel. From the data processed, some the result will be:

- Sea fisheries productivity in WPP-RI 716 Sulawesi
- Operational Scenario KM Mina Jaya Niaga in WPP-RI 716 Sulawesi.
- Capital Expenditure of KM Mina Jaya conversion.
- Operational Expenditure of KM Mina Jaya as a fish carrier ship.
- Revenue operation of ship based on Capital Expenditure and Operational Expenditure.

The data processed in this step will be analysed further in the chapter 4 of this thesis.

3.6 Data Analysis

This study use several basic analysis method, which as follows:

1. Trend analysis

Trend analysis is a time – series analysis, technical analysis that tries to predict the future based on past data. On time – series analysis, the crucial point is the quality and level of accuracy from data that has been collected.

In this thesis, the trend analysis will be explained with the increasing cost which later will affect the profit obtained by the company regarding the conversion of KM Mina Jaya Niaga, which are:

- Increase crew salary 2,5% every year.
- Increase fuel price 2% every year.
- Increase maintenance cost 5% every year.
- Increase ABF contribution 5% every year.
- Increase cold storage contribution 5% every year.
- Increase selling price of fish 2,5% every year.
- Increase purchasing of fish 1,5% every year.
- Increase of sailing fee 5% every years.
- Increase of loading-unloading cost 5% every 5 years.
- Increase of retribution cost 5% every 5 years.
- Increase of ship equipment 2,5% every 5 years.

- Increase of trasnportation and communication cost 5% every 5 years.
- Increase of ship equipment cost 2% every 5 years.
- Increase of fresh water cost 5% every 5 years.
- Increase of port cost 5% every 5 years.
- Increase of administration cost 5% every 5 years.
- Increase of docking cost 10% every 5 years

Estimated increasing price on above, will be clearly different if it implemented on long term investment 15 years.

2. Economic feasibility analysis

Feasibility analysis is an analysis to determine whether the project is feasible or not feasible to execute, based on several aspects such as market, technical and financial.

In this thesis, will also be discussed about the economic feasibility analysis to modify KM Mina Jaya Niaga as a fish carrier ship and the operating system which will be referred from some factors such as:

- The feasibility of fish potential in terms of fish production with the data obtained from KKP.
- The feasibility of KM Mina Jaya Niaga conversion as a fish carrier ship in terms of the operating system.

3. Scenario Analysis

In this thesis will be discussed some scenarios, such as :

- Operational Scenario

  The scenario analysis will explained about how effective operating system in terms of economic and performance to operate KM Mina Jaya Niaga as fish carrier ship in WPP-RI 716 Sulawesi with PP Bitung as the home base port.
- Investment Scenario

  In this scenario will be discussed about investment scenario based on capital or initial investment for KM Mina Jaya Niaga conversion.
- Business Scenario

  In this scenario will be discussed about parties that involved in the conversion and re-operation of KM Mina Jaya Niaga as fish carrier ship.

3.7 Conclusion and Recommendation

This stage is summarize the bachelor thesis research, such as the result of data analysis, recommendation or suggestion and what could we learn about this thesis. Furthermore, this stage is also provided what else can be done in the future about this topic.

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CHAPTER 4
Data Analysis

4.1 Data and Assumption

On this thesis, will be explain about the operational of KM Mina Jaya Niaga longliner ship which converted into fish carrier ship.Figure 4. 1will explain the differences between KM Mina Jaya Niaga operates as a longliner ship and after KM Mina Jaya Niaga converted into a fish carrier ship.

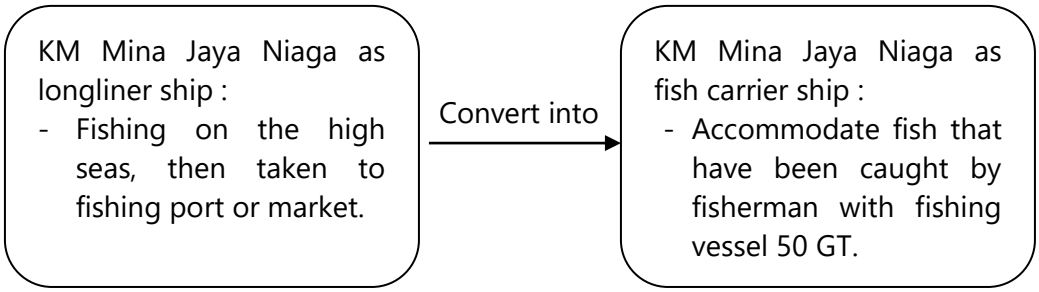


Figure 4. 1Differences KM Mina Jaya Niaga as longliner ship and fish carrier ship.

With converted KM Mina Jaya Niaga become fish carier ship, then the operational pattern will be different from before. If usually KM Mina Jaya Niaga as ship longliner fishing skipjack tuna, with KM Mina Jaya had converted into a fish carrier ship, now KM Mina Jaya Niaga only accomodate fish that have been caught by fisherman.

Table 4. 1and Table 4. 2will show different specifications of KM Mina Jaya longliner ship with KM Mina Jaya Niaga which has been converted into fish carrier ship.

Table 4. 1 General Data of Km Mina Jaya Niaga longliner ship

Item	Specification
Ship Name	Mina Jaya Niaga
Year Of Built	1999
LOA	50,70 m
LPP	43 m
Breadth (B)	8,40 m
Height (H)	3,60 m
Draft (T)	3,20 m
Vs	11 knot
Gross Tonage (GT)	512 GT

Table 4. 2 General Data of KM Mina Jaya Niaga fish carrier ship

Item	Specification
Ship Name	Mina Jaya Niaga
Year Of Built	2017
LOA	50,70 m
LPP	43 m
Breadth (B)	8,40 m
Height (H)	3,60 m
Draft (T)	3,30 m
Vs	11 knot
Gross Tonage (GT)	540 GT

Based on above data, several repair and conversion must needed on KM Mina Jaya Niaga. Those repair and conversion includes of components in various equipment.Some examples of conversions KM Mina Jaya Niaga as a fish carrier ship, such as :

- Release of Ropper Gear System and other fishing equipment.
- Additional bunkering system for ship to ship fuel supply.
- Addition of loading and unloading system loading system at KM Mina Jaya Niaga to move fish load from fishing boat.
- Adding an economical cooling system to the vessel.

Table 4. 3 shows total cost for KM Mina Jaya Niaga's repair and conversion process. Besides, the details of total cost for KM Mina Jaya Niaga will be shown at Appendix 1.

Table 4. 3 Repair and Conversion cost of KM Mina Jaya Niaga conversion

Total Repair and Conversion of KM Mina Jaya Niaga	(Rp)
Repair and conversion Cost	2.425.000.000
Profit of shipyard and vendor (12%)	291.000.000
Tax (10%)	242.500.000
Total	2.958.500.000

The calculation of repair and conversion cost will be added with the price of the ship.This will be used as a reference to know the cash flow from KM Mina Jaya Niaga as a fish carrier ship to calculate and determineof variable financing.

KM Mina Jaya Niaga which has converted into fish carrier ship will operate in WPP-RI 716 Sulawesi sea and accomodate fish catches from the fishermans on this area. WPP-RI 716 was chosen because it has strong potential of

production fish, esecially big pelagic fish like Tuna. Table 4. 4 shows statistics of marine capture fisheries production by species in WPP-RI 716, especially Tuna.

Table 4. 4Statistic of marine capture fisheries production by species in Sulawesi Sea and Nothern of Halmahera Island (WPP-RI 716), 2011-2015[1]

Species	Year				
	2011	2012	2013	2014	2015
Tuna (Albacore, Madidihang, Bigeye)	8228	8045	9619	12795	5188
Skipjack Tuna	21760	28108	28626	38421	42720
Tongkol (Tongkol abu-abu, lisong, kenyar)	41950	54518	92399	108547	79300
Another big pelagic	5343	8163	9098	7045	5802
Jumlah	100408	124352	166068	209616	199172

From the table above, we can see that the production rate of Bigeye Tuna increases on the average of 55.17% per year, meanwhile the production rate of Yellowfin Tuna increases on the average of 27.77% and for Skipjack Tuna it increases about 14.96% per year.

KM Mina Jaya Niaga as a fish carrier ship at WPP-RI 716 has home base port at PP Bitung, Sulawesi. The details of KM Mina Jaya Niaga's home base port will be shown on operational scenario.

4.2 Operational Scenario

After converted from longliner ship to fish carrier ship, KM Mina Jaya Niaga will have home base port in PP Bitung and will be operated in WPP 716.Figure 4. 2shows the operational scenario from KM Mina Jaya Niaga. Which A-B-C-D symbols are ship operational point, while 1-2-3-4-5 symbols are distance, estimation route and time from each ship operational point. Figure 4. 2shows operational scenario scheme of KM Mina Jaya Niaga as fish carrier ship.

[1]Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries. (2016) *Marine Capture Fisheries Statistics by Fisheries Management Area of Republic of Indonesia 2005-2015.*

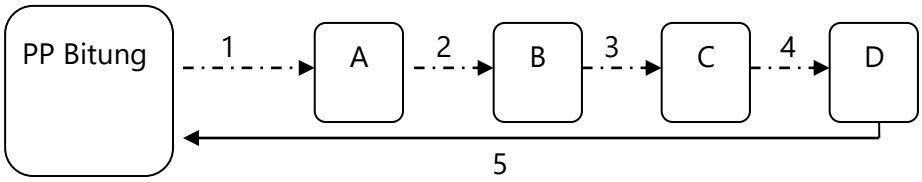


Figure 4. 2Operational Scenario of KM Mina Jaya Niaga as fish carrier ship.

Based onFigure 4. 2,fish carrief ship starts from PP Bitung to first fishing ground (point A) then second fishing ground (point B) and so on. Operational pattern of KM Mina Jaya Niaga from 1- 5 is consecutive and will be ended at PP Bitung.

Operational scenario for this fish carrier ship consists of 3 stage, such as :

a) PP Bitung - Preparation Stage

Before conducted the operational stage, should have done the preparation stage. The preparation stage including:

1. Bunkering process of fuel, fresh water and logistic in PP Cempae. Bunkering of fuel and fresh water based on capacity KM Mina Jaya Niaga which has fuel oil tank capacity 349,54 m^3 and fresh water tank capacity 33,76 m^3.
2. After finish the bunkering process, then sail to fishing ground point A.

b) Point A, B, C, D - Operational Stage

On the operational stage, ship will be operate around fishing ground, which means :

1. Fish carrier ship will be operated at point A, B, C, and D. Every point has several fisherman ship with a measurement of 50 GT, the fisherman transfer their fish catches to KM Mina Jaya Niaga as a fish carrier ship. The capacity of 50 GT ship fit up to 31,25 ton with comparison between ice and fish is 50:50 so, the total of fish catches which transfered from fisherman ship is estimated in amount of 15 ton for every 50 GT ship. While waiting for fish transferring to KM Mina Jaya Niaga fish carrier ship, they also do fuel transferring, logistic transferring and crew transferring according to their needs. All of the process is estimated takes 2 hours for every single ship.
2. Fish that have been obtained from fisherman will be gathered in the processing room.
3. Fish that has been obtained from fisherman will be cut and cleaned.
4. After is cleaned then it washed with ice water. Assumed that 1 kg of fish need 1 kg of ice.

5. After cleaning process is done, fish will be included to trey and getting frozen at freezer around 8 hours, then transfered to the fishing hold (cold storage).

c) PP Bitung - Selling Stage

After fish is collected and stored at the inside of cold storage, fish would be sold to partner or market. From this selling stage, it become benefit for the operator company.

Total of the distance that KM Mina Jaya Niaga as a fish carrier ship for 1 voyage from PP Bitung - A – B – C – D – PP Bitung is 157,25 km, with velocity servis 8 knot. It is estimated that 1 voyage takes 10,92 hours plus the estimated loading and unloading time in each fishing ground is 2 hours, so the total time of 1 voyage is about 18.92 hours or 0.8 days. If 1 trip time coupled with loading and unloading process in PP Bitung is estimated to be up to 1 day and estimated time to berth on port is 4 days, then total operational of KM Mina Jaya Niaga is 5,7 days or 6 days. The details of calcultaion of distance, time, unloading, and fuel process during KM Mina Jaya Niaga's operational as fish carrier ship will be shown atAppendix 2.

The cost from operational of KM Mina Jaya Niaga affected by the distance and operational time as a fish carrier ship. The explanation about total cost which is needed by KM Mina Jaya Niaga will be shown at economic analysis.

4.3 Assumption and Parameter for Economic Analysis

This thesis will determine the feasibility of KM Mina Jaya Niaga's operational which converted from longliner ship into fish carrier ship. Determination of feasibility can be seen from the economic analysis. Thus, will affect how variable financing will be made to modify and operational financing for KM Mina Jaya Niaga as a fish carrier ship.

There are several cost factors that can affect the process to determine the feasibility and make the economic analysis, such as capital expenditure, component of investment project capital, and operational expenditure.

4.3.1 Capital Expenditure

Capital expenditure is the investment cost which used to start the project. Capital expenditures include repair and conversion costs for KM Mina Jaya Niaga plus ship price.

Table 4. 5 shows total capital expenditure of KM Mina Jaya Niaga's. Besides, the details of total cost for KM Mina Jaya Niaga will be shown at Appendix 1.

Table 4. 5Capital Expenditure of KM Mina Jaya Niaga

Total Capital Expenditure of KM Mina Jaya Niaga	(Rp)
Total cost for repair and conversion	2.958.500.000
Price of the ship	4.000.000.000
Total	6.958.500.000

The price of the ship is estimated around Rp4.000.000.000,- so the total capital expenditure of KM Mina Jaya Niaga is Rp6.958.500.000,- or around Rp7.000.000.000,-.

4.3.2 Component of Investment Project Capital

The cost of repair and conversion of KM Mina Jaya Niaga requires capital of Rp 2.958.500.0000,- or around Rp3.000.000.000,-. Based on that condition, there will be some example of scenarios to cover the repair and conversion cost of KM Mina Jaya Niaga. Some examples of financing scenarios, such as :

- Full equity to cover the repair and conversion cost of Km Mina Jaya Niaga.
- Full loan from bank to cover the repair and conversion cost of KM Mina Jaya Niaga.
- Or getting loan from the bank 60% of total repair and conversion cost. While, 40% of total repair and conversion will be covered with company's capital. Table 4. 6 shows the component and structure of KM Mina Jaya Niaga's Capital Expenditure from scenario Loan-Equity.

Table 4. 6Component and structure of CAPEX KM Mina Jaya Niaga scenario Loan-Equity

Project Cost Component	Precentage	Total Cost (Rp)
Credit from Bank	60%	1.800.000.000
Self-funded	40%	1.200.000.000
Total	100%	3.000.000.000

Cost obtained from the bank loans will have 2 years installments for scenario Loan-Equity and 5 years installment for scenario full loan from ban, with an interest rate of 11% per annum on each scenario.The interest will have to be pay by the company along with the installments costs which needs to be paying every year. Table 4. 7 will show the calculation for installments cost for the company every year from full loan scenario. For the detail installment will be shown at Appendix 3.

Table 4. 7 Credit Installment Recapitulation Full Loan scenario

Period	Fix Installment	Interest	Total	Beginning Balance	Ending Balance
				3.000.000.000	3.000.000.000
Year - 1	600.000.000	299.750.000	899.750.000		
Year - 2	600.000.000	233.750.000	833.750.000		
Year - 3	600.000.000	167.750.000	767.750.000		
Year - 4	600.000.000	101.750.000	701.750.000		
Year - 5	600.000.000	35.750.000	635.750.000		

Table 4. 8will show the calculation for installments cost for the company every year from Loan – Equity scenario. For the detail installment will be shown at Appendix 3.

Table 4. 8 Credit Installment Recapitulation Loan – Equity Scenario

Period	Fix Installment	Interest	Total	Beginning Balance	Ending Balance
				1.800.000.000	1.800.000.000
Year 1	900.000.000	152.625.000	1.052.625.000		
Year 2	900.000.000	53.625.00	953.625.000		

4.3.3 Operational Expenditure

Operational Expenditure is an outflow cost for KM Mina Jaya Niaga's operational activities. Operational Expenditure has a strong impact to company revenue. Because of that, the calculation of Operational Expenditure must clear and precise.

Operational Expenditure affected by several cost component, such as:

a. Revenue that comes from sales of fish per month. Sales of fish depends on the amount of fish catches which can be affected by the weather or season. Total revenue based on high season in a year will be shown at Appendix 4.Figure 4. 3will show the estimation of skipjack tuna production in ton which the collective assumption from fishing ground fitting the fishing season.

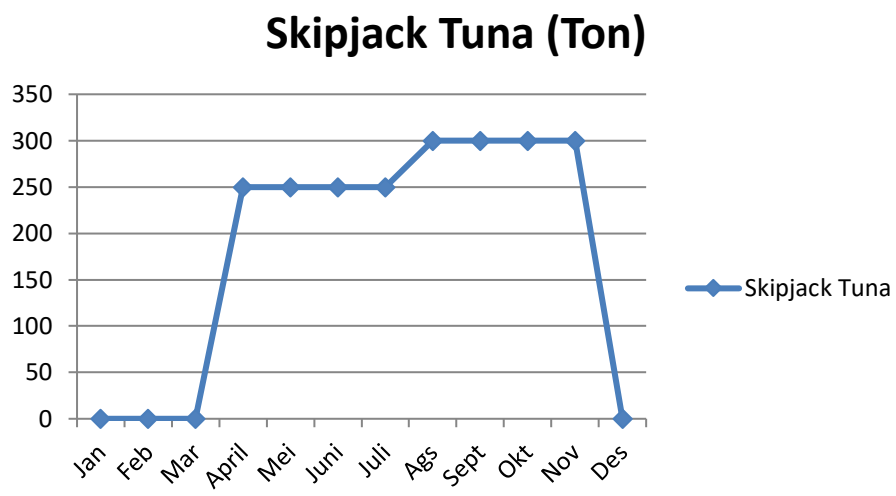


Figure 4. 3 Graphic Production Skipjack Tuna

Based on the figure above, can be obtained that the amounts of Skipjack Tuna catches in April until July (medium season), is estimated around 250 ton/month. In August to November (high season), the amount of Skipjack Tuna catches is estimated around 300 ton/month, while in January to March and December (low season) the number of catches is 0 due to the bad weather and these 4 months are used to do the ship docking.

Figure 4. 4 Revenue Skipjack Tuna (Milyar Rp)will show the estimation of income in billion rupiah units from the selling of the skipjack tuna production based on the fishing season, and the estimation of skipjack tuna selling is Rp30.000,- per kilogram.

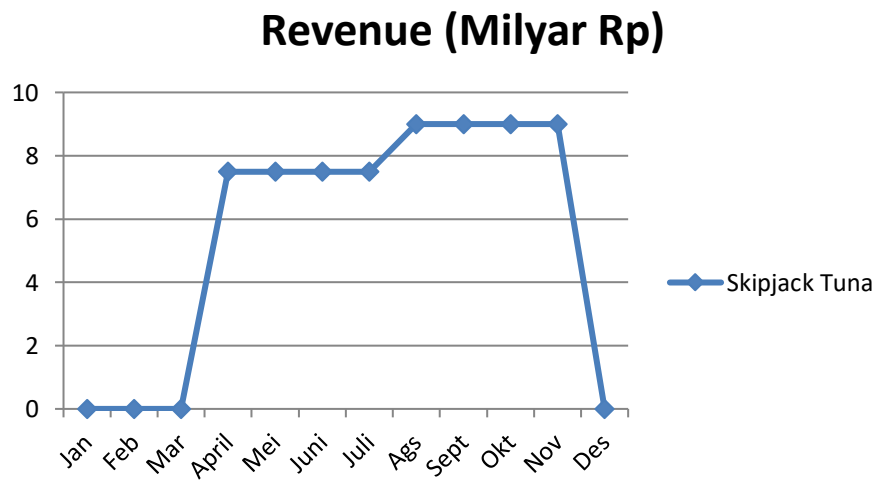


Figure 4. 4 Revenue Skipjack Tuna (Milyar Rp)

Based on the figure above can be obtained that the total income of selling the fish catches from April until July (medium season) is Rp7.500.000.000,-. From August until November (high season) fish catches income is Rp9.000.000.000,-, while in January until March and December (low season) the number of income is 0 because there are no fishing activity.

b. Operational cost which consist of Fixed Cost and Voyage Cost.

- Fix cost is the number of cost needs to be pay fully in a month, whether the ship is operating (high and medium season) nor the ship is docking (bad weather and docking). Fixed cost consists of some cost components such as crew salary, crew assurance, and the ship's lubrication.
- Voyage cost is the amount of expense that needs to be pay only when the ship is operating (medium and high season). Voyage cost consists of some components such as fish sales, fuel costs, docking at the harbor cost, loading and unloading cost, and etc.

Figure 4. 5 will show comparison of fix cost and voyage cost within 1 year period.

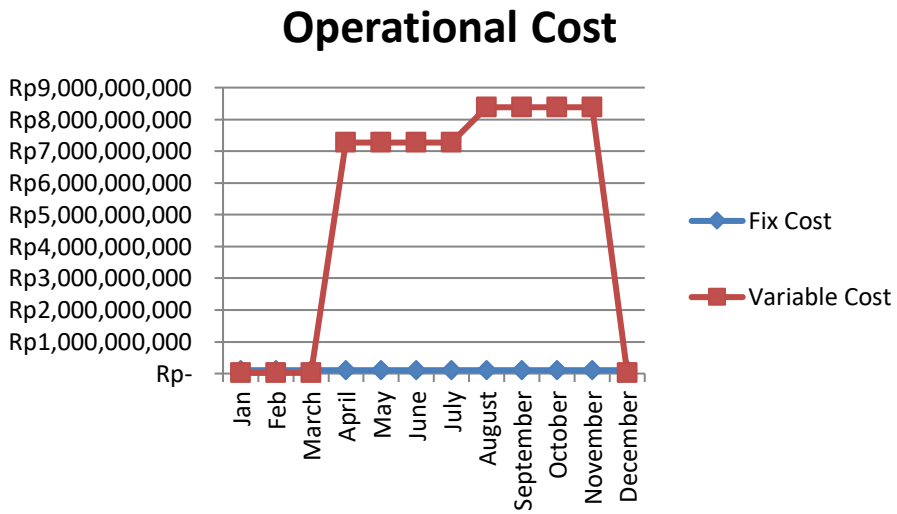
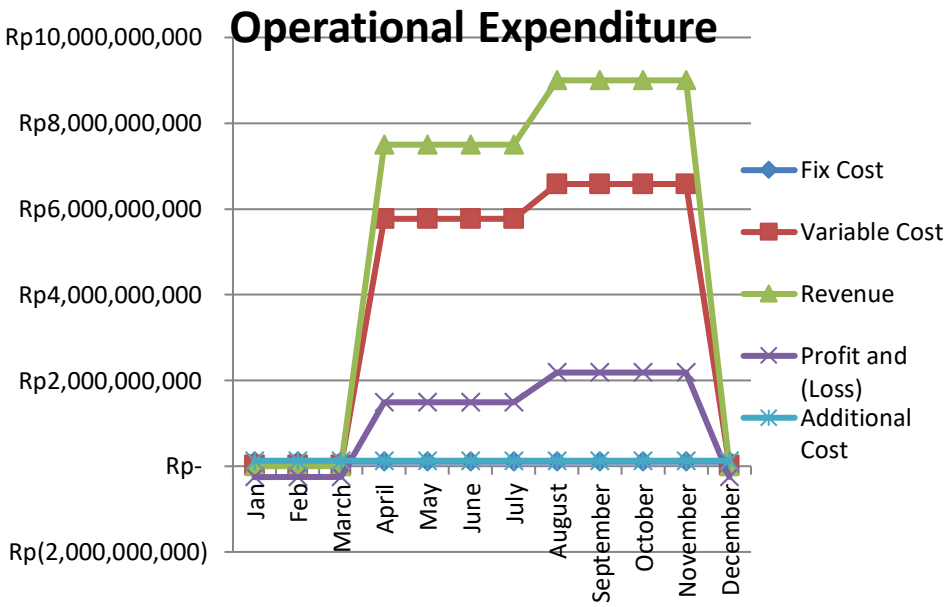


Figure 4. 5 Fix cost and Voyage cost

c. Additional cost which consist of docking cost and administration cost.

Figure 4. 6will show a comparison of operational expenditure costs within 1 year.

Figure 4. 6 Operational Expenditure



From the figure above can be seen that in low season (December, January, February, March) the company will incur losses. This is due to the low season no income at all, but still had to pay fixed costs.Table 4. 9shows the estimated amount of total operational expenditure in a year and for the detail will be shown at Appendix 5.

Table 4. 9 Operational Expenditure

A.	**Revenue**	Rp 66.000.000.000
B.	**Operational Cost**	
	Fixed Cost	Rp 1.263.000.000
	Voyage Cost	Rp 62.700.552.604
C.	**Additional Cost**	Rp 1.540.000.000
	Total Cost	Rp 65.503.552,604
	Profit and (Loss)	Rp 496.447.396

4.4 Cashflow

After knowing the assumption of any factors affecting the analysis from an economic point of view for the project, the next thing to do is cashflow arrangement. The arrangement of cash flow consist cost of capital expenditure,

cost of operational expenditure, and additional cost per year. Cashflow arrangement will begin from year-0 for repairing and modifying the ship, and for 15 years of ship operation.

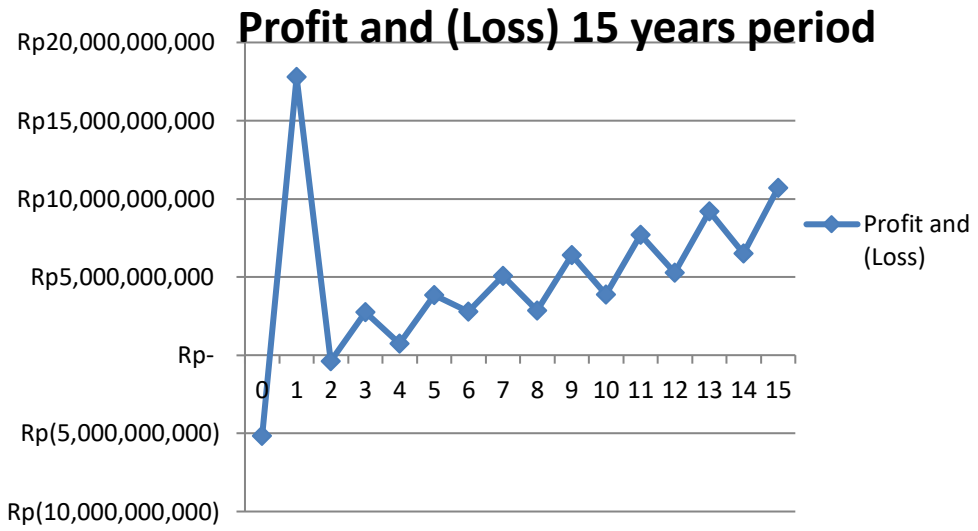


Figure 4. 7will define the total of profit and loss from year-0 to year-15 of operation of the ship.

From the figure below, we can see that the value total profit and loss in each year always changing. This is due to several assumption factors, such as :

- Increase crew salary 2,5% every year.
- Increase fuel price 2% every year.
- Increase maintenance cost 5% every year.
- Increase ABF contribution 5% every year.
- Increase cold storage contribution 5% every year.
- Increase selling price of fish 2,5% every year.
- Increase purchasing of fish 1,5% every year.
- Increase of sailing fee 5% every years.
- Increase of loading-unloading cost 5% every 5 years.
- Increase of retribution cost 5% every 5 years.
- Increase of ship equipment 2,5% every 5 years.
- Increase of trasnportation and communication cost 5% every 5 years.
- Increase of ship equipment cost 2% every 5 years.
- Increase of fresh water cost 5% every 5 years.
- Increase of port cost 5% every 5 years.
- Increase of administration cost 5% every 5 years.
- Increase of docking cost 10% every 5 years.

For the detail calculation of profit and loss and it several assumption will be shown at Appendix 6.

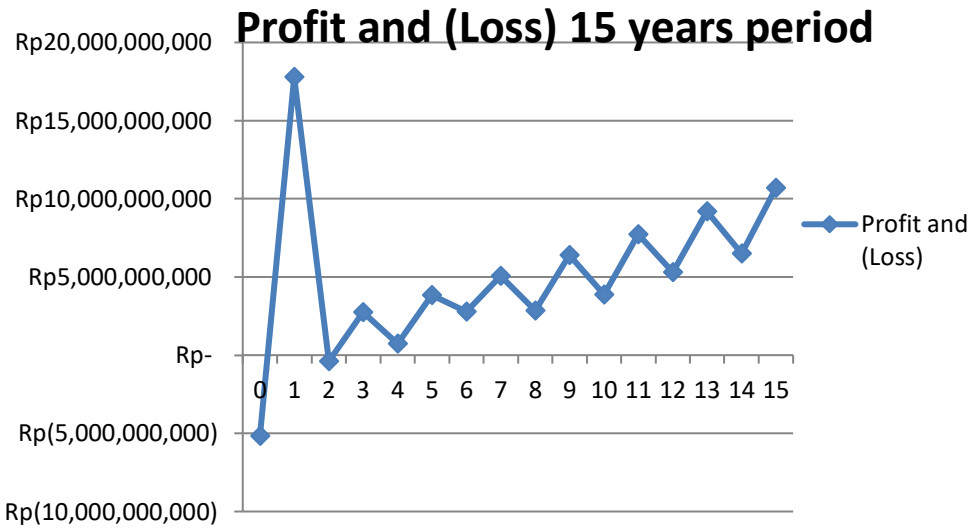


Figure 4. 7 Profit and (Loss) 15 years period

From the graphic above can be seen that every 2 years company earnings decreased. This is caused by ship docking costs every 2 years. After knowing profit and loss in 15 year, the next thing is calculate cash flow to know whether the project is feasible or not. The cash flow calculation will be arranged from 0 year untill 15 year as shown at Table 4. 10.

From Table 4. 10 it cansee that income in year 0 is obtained from loans provided by the bank. We also can see earning after tax (EAT) obtained from the total revenue minus total expenditure, ship depreciation, installment, taxed at 15%, plus ship depreciation. This is due to the ship depreciation not reduce revenue, but only reduce the value of the assets of the project which the value of the ship.

It can also be seen that the NPV value of Rp4.629.121.002, IRR of 29%, and Payback Period 4,27 year. These parameters indicate that the project is feasible to be implemented.

Table 4. 10 Cash flow (Rupiah)

Year	Revenue	Expenditure	EBITDA	Depreciation	EBIT	Installment	EBT	Tax (15%)	EAT
0	3.000.000.000	(6.958.500.000)							(3.958.500.000)
1	8.990.888.151	(64.203.552.604)	17.787.335.547	463.900.000	17.323.435.547	7.720.307.988	9.603.127.560	1.440.469.134	8.626.558.426
2	67.650.000.000	(68.042.522.656)	(392.522.656)	463.900.000	(856.422.656)	7.067.975.422	(7.924.398.078)	(1.188.659.712)	(6.271.838.366)
3	69.341.250.000	(66.585.088.984)	2.756.161.016	463.900.000	2.292.261.016	6.415.642.857	(4.123.381.841)	(618.507.276)	(3.040.974.564)
4	71.074.781.250	(70.351.898.835)	722.882.415	463.900.000	258.982.415	701.750.000	(442.767.585)	(66.415.138)	87.547.552
5	72.851.650.781	(68.999.162.818)	3.852.487.963	463.900.000	3.388.587.963	635.750.000	2.752.837.963	412.925.694	2.803.812.269
6	74.672.942.051	(71.900.989.412)	2.771.952.638	463.900.000	2.308.052.638		2.308.052.638	346.207.896	2.425.744.743
7	76.539.765.602	(71.460.158.522)	5.079.607.080	463.900.000	4.615.707.080		4.615.707.080	692.356.062	4.387.251.018
8	78.453.259.742	(75.590.897.600)	2.862.362.142	463.900.000	2.398.462.142		2.398.462.142	359.769.321	2.502.592.821
9	80.414.591.236	(74.029.487.792)	6.385.103.444	463.900.000	5.921.203.444		5.921.203.444	888.180.517	5.496.922.927
10	82.424.956.017	(78.561.409.662)	3.863.546.355	463.900.000	3.399.646.355		3.399.646.355	509.946.953	3.353.599.401
11	84.485.579.917	(76.772.142.964)	7.713.436.953	463.900.000	7.249.536.953		7.249.536.953	1.087.430.543	6.626.006.410
12	86.597.719.415	(81.305.229.979)	5.292.489.436	463.900.000	4.828.589.436		4.828.589.436	724.288.415	4.568.201.021
13	88.762.662.400	(79.577.568.907)	9.185.093.493	463.900.000	8.721.193.493		8.721.193.493	1.308.179.024	7.876.914.469
14	90.981.728.960	(84.488.692.342)	6.493.036.618	463.900.000	6.029.136.618		6.029.136.618	904.370.493	5.588.666.126
15	93.256.272.184	(82.573.328.646)	10.682.943.538	463.900.000	10.219.043.538		10.219.043.538	1.532.856.531	9.150.087.007

NPV = Rp4.629.121.002,- ; IRR = 29% ; Payback Period = 4,27 year

4.5 Investment Scenario

In this chapter will be discussed about investment scenario based on capital or initial investment for KM Mina Jaya Niaga conversion. The scenarios in this chapter are influenced by several factors, including:

- Investment project capital (Loan-Equity, Full Loan, Full Equity)
- Based on the discount rate (i) used to obtain value of NPV, IRR and Payback Period.

This investment scenario will be calculated for 15 years ship operation.

4.5.1 1st Investment Scenario

In this first scenario of investment will be discussed the investment scenario for the operation of KM Mina Jaya Niaga as a fish carrier ship for 15 years. Investment scenario is done with the aim to get the value of NPV, IRR and Payback Period in investing this project. The determination of the value of NPV, IRR and Payback Period based on project capital investment with dicount rate (*i*) 10%.

Table 4. 11 will show comparison of NPV, IRR and Payback Period with investment project capital Loan – Equity, Full Loan, and Full Equity with discount rate (*i*) 10%.

Table 4. 11 Investment Project Capital with (i) 10%

Item	NPV	IRR	Payback Period
Loan - Equity	4.164.567.270	23%	4,32 year
Full Loan	4.639.121.002	29%	4,27 year
Full Equity	3.601.243.315	18%	4,15 year

From the table above we could see if we use investment project capital Loan-Equity will get NPV Rp4.164.567.270 with IRR 23% and Payback Period 4,32 year. If investment project capital full loan from bank will get NPV Rp4.639.121.002 with IRR 29% and Payback Period 4,27 year. While, when we choose to use investment project capital full equity we will get NPV Rp3.601.243.315 with IRR 18% and Payback Period 4,15 year.

4.5.2 2nd Investment Scenario

In this secondscenario of investment will be discussed the investment scenario for the operation of KM Mina Jaya Niaga as a fish carrier ship for 15 years. Investment scenario is done with the aim to get the value of NPV, IRR and Payback Period in investing this project. The determination of the

value of NPV, IRR and Payback Period based on project capital investment with dicount rate (*i*) 12%.

Table 4. 12 will show comparison of NPV, IRR and Payback Period with investment project capital Loan – Equity, Full Loan, and Full Equity with discount rate (*i*) 12%.

Table 4. 12 Investment Project Capital with (i) 12%

Item	NPV	IRR	Payback Period
Loan - Equity	2.885.839.062	17%	4,08 year
Full Loan	3.407.940.223	20%	4,01 year
Full Equity	2.395.188.661	15%	4,15 year

From the table above we could see if we use investment project capital Loan-Equity will get NPV Rp2.885.839.062 with IRR 17% and Payback Period 4,08 year. If investment project capital full loan from bank will get NPV Rp3.407.940.223 with IRR 20% and Payback Period 4,01 year. While, when we choose to use investment project capital full equity we will get NPV Rp2.395.188.661 with IRR 15% and Payback Period 4,15 year.

4.5.3 3rd Investment Scenario

In this third scenario of investment will be discussed the investment scenario for the operation of KM Mina Jaya Niaga as a fish carrier ship for 15 years. Investment scenario is done with the aim to get the value of NPV, IRR and Payback Period in investing this project. The determination of the value of NPV, IRR and Payback Period based on project capital investment with dicount rate (*i*) 15%.

Table 4. 13 will show comparison of NPV, IRR and Payback Period with investment project capital Loan – Equity, Full Loan, and Full Equity with discount rate (*i*) 15%.

Table 4. 13 Investment Project Capital with (i) 15%

Item	NPV	IRR	Payback Period
Loan - Equity	1.488.614.468	14%	4,08 year
Full Loan	2.704.304.006	17%	4,01 year
Full Equity	955.741.267	12%	4,15 year

From the table above we could see if we use investment project capital Loan-Equity will get NPV Rp1.488.614.468 with IRR 14% and Payback

Period 4,08 year. If investment project capital full loan from bank will get NPV Rp2.704.304.006 with IRR 17% and Payback Period 4,01 year. While, when we choose to use investment project capital full equity we will get NPV Rp955.741.267 with IRR 15% and Payback Period 4,15 year.

4.5.4 4th Investment Scenario

In this fourthscenario of investment will be discussed the investment scenario for the operation of KM Mina Jaya Niaga as a fish carrier ship for 15 years. Investment scenario is done with the aim to get the value of NPV, IRR and Payback Period in investing this project. The determination of the value of NPV, IRR and Payback Period based on project capital investment with dicount rate (*i*) 18%.

Table 4. 14 will show comparison of NPV, IRR and Payback Period with investment project capital Loan – Equity, Full Loan, and Full Equity with discount rate (*i*) 18%.

Table 4. 14 Investment Project Capital with (i) 18%

Item	NPV	IRR	Payback Period
Loan - Equity	420.317.606	11%	4,08 year
Full Loan	1.061.566.812	14%	4,01 year
Full Equity	(152.020.232)	10%	4,15 year

From the table above we could see if we use investment project capital Loan-Equity will get NPV Rp420.317.606 with IRR 11% and Payback Period 4,08 year. If investment project capital full loan from bank will get NPV Rp1.061.566.812 with IRR 14% and Payback Period 4,01 year. While, when we choose to use investment project capital full equity we will get NPV (Rp152.020.232), which meansvalue of NPV is less than with IRR 15% and Payback Period 4,15 year.

Table 4. 15will show the comparison between investment project capital Loan-Equity, Full Loan and Full Equity with different discount rate (*i*).

Table 4. 15Comparison Investment Project Capital

Type of Capital Investment	Discount Rate (*i*)	NPV	IRR	Payback Period
Loan-Equity	10%	4.164.567.270	23%	4,32 year
	12%	2.885.839.062	17%	4,08 year
	15%	1.488.614.468	14%	4,08 year
	18%	420.317.606	11%	4,08 year
Full Loan	10%	4.639.121.002	29%	4,27 year
	12%	3.407.940.223	20%	4,01 year
	15%	2.704.304.006	17%	4,01 year
	18%	1.061.566.812	14%	4,01 year
Full Equity	10%	3.601.243.315	18%	4,15 year
	12%	2.395.188.661	15%	4,15 year
	15%	955.741.267	12%	4,15 year
	18%	(152.020.232)	10%	4,15 year

From the comparison of some scenarios above can be seen that the discount rate (*i*) will affect the value of NPV, IRR and Payback Period.A project can be assessed economically feasible if the NPV is more than 0, the IRR is greater than bank interest and a short payback period. This makes investors interested to invest on the project.

4.6 Business Scenario

To make improvements, conversion and KM Mina Jaya Niaga operation as a fish carrier ship need a lot of money. For ease the costs of KM Mina Jaya Niaga, in this thesis will be explain some business scenario involving some parties, one of which is PT IKI as the owner of a KM Mina Jaya Niaga. PT B and PT C as fishing companies and operator, fish trader as a buyer of fish and fisherman.

Each parties certainly have a project capital to serve as initial capital to start this project. On this business scenario each parties will use Loan – Equity.

4.6.1 1st Scenario

This first scenario would discuss the relation between PT IKI as the owner of KM Mina Jaya Niaga with PT B as a charterer and ship operator of KM Mina Jaya Niaga. This ship operations will be conducted for 15 years. Table 4. 16explains each expense that has to be paid by PT IKI and PT B.

Table 4. 16 1st Scenario

Item	PT. IKI	PT. B	PT. C	Fisherman	Fish Trader
- Investment	v	x	x	x	x
- Ship ownership	v	x	x	x	x
- Working Capital	x	v	x	x	x
- Maintenance	v	x	x	x	x
- Fish Selling	x	v	x	x	x
- Fixed Cost (except maintenance and administration)	x	v	x	x	x
- Voyage Cost	x	v	x	x	x
- Additional Cost	x	v	x	x	x

From the table above, it can be seen that the expenses PT IKI has to covered as the owner of the ship are capital expenditure in the 0 year and maintenance expense for Rp3.000.000.000,- in the first year. PT IKI must also pay bank instalments for 1.052.625.000 in the 1st year and Rp953.625.000 in the 2nd year.For the detail calculation of PT IKI cashflow will be shown atTable 4. 17.

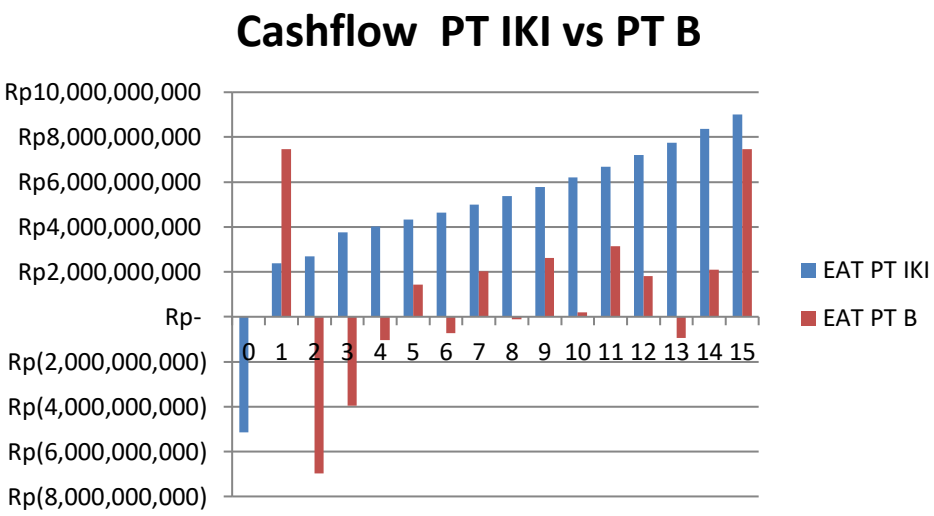
Besides of pay the repair and conversionship investment, PT IKI get revenue in the form of charterred cost of ship, ABF lease and cold storage paid by PT B. We also can see that the value total profit and loss in each year always changing. This is due to several assumption factors, such as :

- Increase crew salary 2,5% every year.
- Increase fuel price 2% every year.
- Increase maintenance cost 5% every year.
- Increase ABF contribution 5% every year.
- Increase cold storage contribution 5% every year.
- Increase selling price of fish 2,5% every year.
- Increase purchasing of fish 1,5% every year.
- Increase of sailing fee 5% every years.
- Increase of loading-unloading cost 5% every 5 years.
- Increase of retribution cost 5% every 5 years.
- Increase of ship equipment 2,5% every 5 years.
- Increase of trasnportation and communication cost 5% every 5 years.
- Increase of ship equipment cost 2% every 5 years.
- Increase of fresh water cost 5% every 5 years.
- Increase of port cost 5% every 5 years.

- Increase of administration cost 5% every 5 years.
- Increase of docking cost 10% every 5 years

Figure 4. 8will show cash flow ratio of PT IKI and PT B.

Figure 4. 8 Cashflow ratio 1st Scenario



From the figure above we could see that every 2 years PT B will have decrease in revenue. This is because every 2 years PT B must pay for docking ships.

Table 4. 17Cash flow PT. IKI Scenario 1 (Rupiah)

Year	Revenue	Expenditure	EBITDA	Depreciation	EBIT	Installment	EBT	Tax (15%)	EAT
0	1.800.000.000	(6.956.956.700)							(5.156.956.700)
1	4.240.000.000	(480.000.000)	3.760.000.000	1.391.391.340	2.368.608.660	1.052.625.000	1.315.983.660	197.397.549	2.509.977.451
2	4.532.000.000	(495.000.000)	4.037.000.000	1.391.391.340	2.645.608.660	953.625.000	1.691.983.660	253.797.549	2.829.577.451
3	4.846.600.000	(510.750.000)	4.335.850.000	1.391.391.340	2.944.458.660		2.944.458.660	441.668.799	3.894.181.201
4	5.185.730.000	(527.287.500)	4.658.442.500	1.391.391.340	3.267.051.160		3.267.051.160	490.057.674	4.168.384.826
5	5.551.496.500	(544.651.875)	5.006.844.625	1.391.391.340	3.615.453.285		3.615.453.285	542.317.993	4.464.526.632

Year	Revenue	Expenditure	EBITDA	Depreciation	EBIT	Installment	EBT	Tax (15%)	EAT
6	5.946.199.325	(562.884,469)	5.383.314.856	463.900.000	4.919.414.856		4.919.414.856	737.912.228	4.645.402.628
7	6.372.350.091	(582.028.692)	5.790.321.399	463.900.000	5.326.421.399		5.326.421.399	798.963.210	4.991.358.189
8	6.832.692.476	(602.130.127)	6.230.562.349	463.900.000	5.766.662.349		5.766.662.349	864.999.352	5.365.562.997
9	7.330.224.468	(623.236.633)	6.706.987.834	463.900.000	6.243.087.834		6.243.087.834	936.463.175	5.770.524.659
10	7.868.222.796	(645.398.465)	7.222.824.331	463.900.000	6.758.924.331		6.758.924.331	1.013.838.650	6.208.985.681
11	8.450.269.751	(668.668.388)	7.781.601.363	463.900.000	7.317.701.363		7.317.701.363	1.097.655.204	6.683.946.158
12	9.080.282.635	(693.101.807)	8.387.180.828	463.900.000	7.923.280.828		7.923.280.828	1.188.492.124	7.198.688.704
13	9.762.546.103	(718.756.898)	9.043.789.206	463.900.000	8.579.889.206		8.579.889.206	1.286.983.381	7.756.805.825
14	10.501.747.679	(745.694.743)	9.756.052.936	463.900.000	9.292.152.936		9.292.152.936	1.393.822.940	8.362.229.996
15	11.303.016.760	(773.979.480)	10.529.037.280	463.900.000	10.065.137.280		10.065.137.280	1.509.770.592	9.019.266.688

NPV =Rp2.503.178.915,- ; IRR = 46% ; Payback Period = 2,43 year

Table 4. 18 Cash flow PT B Scenario 1 (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	78.645.888.151	(52.423.552.604)	26.222.335.547	5.413.016.321	20.809.319.226	3.121.397.884	17.687.921.342
2	67.650.000.000	(56.071.522.656)	11.578.477.344	4.947.683.756	6.630.793.589	994.619.038	5.636.174.550
3	69.341.250.000	(54.555.293.984)	14.785.956.016	4.482.351.190	10.303.604.826	1.545.540.724	8.758.064.102
4	71.074.781.250	(58.277.048.660)	12.797.732.590		12.797.732.590	1.919.659.888	10.878.072.701
5	72.851.650.781	(51.674.030.934)	21.177.619.847		21.177.619.847	3.176.642.977	18.000.976.870
6	74.672.942.051	(75.522.361.911)	(849.419.860)		(849.419.860)	(127.412.979)	(722.006.881)
7	76.539.765.602	(74.163.706.122)	2.376.059.480		2.376.059.480	356.408.922	2.019.650.558
8	8.453.259.742	(78.577.894.960)	(124.635.218)		(124.635.218)	(18.695.283)	(105.939.935)
9	80.414.591.236	(77.328.279.888)	3.086.311.348		3.086.311.348	462.946.702	2.623.364.646
10	82.424.956.017	(82.203.588.468)	221.367.549		221.367.549	33.205.132	188.162.417
11	84.485.579.917	(80.791.593.400)	3.693.986.516		3.693.986.516	554.097.977	3.139.888.539
12	86.597.719.415	(84.468.516.810)	2.129.202.605		2.129.202.605	319.380.391	1.809.822.214
13	88.762.662.400	(89.881.788.785)	(1.119.126.385)		(1.119.126.385)	(167.868.958)	(951.257.427)
14	90.981.728.960	(88.519.170.608)	2.462.558.352		2.462.558.352	369.383.753	2.093.174.599
15	93.256.272.184	(84.468.516.810)	8.787.755.374		8.787.755.374	1.318.163.306	7.469.592.068

NPV = (Rp5.253.526.594,-) ; IRR = 0% ; Payback Period = 7,07 year

Meanwhile, from table 4.11 we can see the table of cash flow PT. B.It shows that as the chartererand operator of KM Mina Jaya Niaga, PT. B must pay the ship charter cost for Rp1.600.000.000.,- in the 1st year, operational cost and additional cost.PT B also should pay installment for 3 year. This installment is used to pay off working capital that loans by the bank for Rp12.645.888.151,-. To know the detail calculation profit and loss from 1st scenario could be seen at Appendix 7.

Based on the cashflow calculationof PT. IKIwith a discount rate of 10%, then the value of NPV obtained is Rp2.503.178.915,- with IRR 46% and Payback Period2,43 year. While, with the same discount rate (*i*) PT B get the NPV value of (Rp5.253.526.594,-) with IRR 0% and Payback Period 7,07 year. As already discussed in the investment scenario that the discount rate will affect the value of NPV, IRR and Payback Period. So in this business scenario also will be discussed on the variation of the discount rate.Table 4. 19will explain the comparison of the difference in discount rate (*i*) on 1st business scenario.

Table 4. 19Comparison of Discount Rate (i) 1st Secnario

(*i*)	PT IKI			PT B		
	NPV	**IRR**	**Payback Period**	**NPV**	**IRR**	**Payback Period**
10%	2.503.178.915,90	46%	2,43	2.518.692.396,51	0	7,07
12%	34.586.670.529,87	44%	2,43	1.802.032.323,70	-	6,57
15%	19.086.280.542,76	40%	2,43	1.774.544.078,36	-	6,57
18%	10.282.430.066,02	36%	2,43	1.904.070.419,49	-	6,57

This business scenario in the first scenario is therefore considered feasible for PT IKI as the owner of the ship but, it is not feasible for PT B as a charterer and the operator of the ship. Because IRR value of PT B is 0%, which means lower than bank interest.

4.6.2 2nd Scenario

This second scenario would discuss the relation between PT IKI as the owner of KM Mina Jaya Niaga with PT B as a charterer and ship operator of KM Mina Jaya Niaga, and PT C as a party who will be selling and purchase of fish. This ship operations will be conducted for 15 years. Table 4. 20will explains each expense that has to be paid by PT IKI, PT B and PT C.

Table 4. 20 2nd Scenario

Item	PT. IKI	PT. B	PT. C	Fisherman	Fish Trader
- Investment	v	x	x	x	x
- Ship ownership	v	x	x	x	x
- Working Capital	x	v	v	x	x
- Maintenance	v	x	x	x	x
- Fish Selling	x	x	v	x	x
- Fish Purchasing	x	x	v	x	x
- Fixed Cost (except maintenance)	x	v	x	x	x
- Voyage Cost (except fish purchasing and administration)	x	v	x	x	x
- Additional Cost	x	v	x	x	x

From the table above, it can be seen that the expenses PT IKI has to covered as the owner of the ship are capital expenditure for repair and conversion cost in the 0th year. For the next year PT IKI will covered maintenance costand administration cost of ship as the owner. PT IKI also should pay bank instalments for Rp1.052.625.000 in the 1st year and Rp953.625.000 in the 2nd year. For the detail calculation cash flow of PT. IKI will be shown onTable 4. 22.

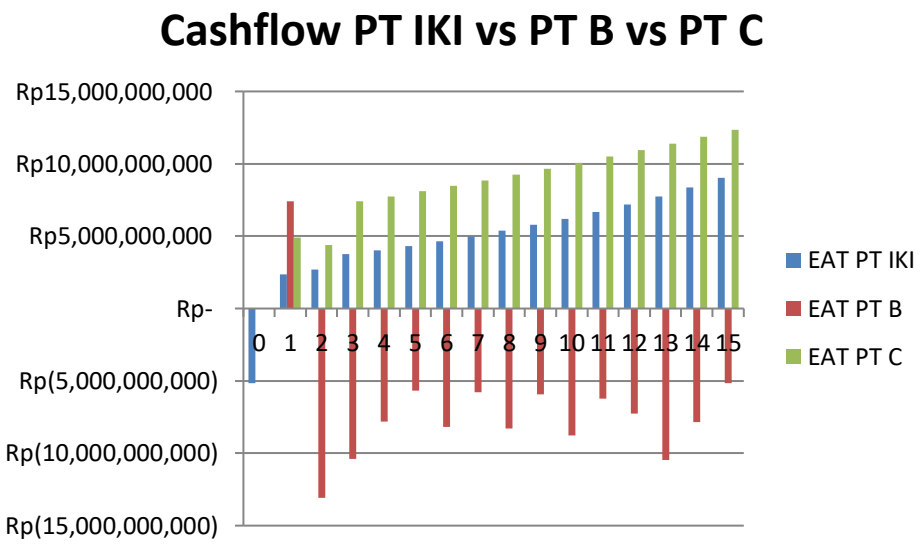
In this second scenario PT B remains as a charterer and as a ship operator, but does not incur any costs for the sell and purchase of fish. So the costs which covered by PT B slightly reduced. For the cost of purchasing and selling fish will be covered by PT C as the third party. Later proceeds from the selling of fish by PT C will do a profit sharing with PT B, with a ratio of 60% for PT B and 40% for PT C. Sharing of profit given to PT B is larger than PT C, because it is proportional to the cost incurred by PT B. Figure 4. 9 Cash flow ratio 2nd Scenariowill be shown cash flow ratio from PT IKI, PT B and PT C.

Similar to scenario 1, the income and expenditures earned by each company in this scenario also increase in each year. This is due to several assumptions, such as:

- Increase crew salary 2,5% every year.
- Increase fuel price 2% every year.
- Increase maintenance cost 5% every year.

- Increase ABF contribution 5% every year.
- Increase cold storage contribution 5% every year.
- Increase selling price of fish 2,5% every year.
- Increase purchasing of fish 1,5% every year.
- Increase of sailing fee 5% every years.
- Increase of loading-unloading cost 5% every 5 years.
- Increase of retribution cost 5% every 5 years.
- Increase of ship equipment 2,5% every 5 years.
- Increase of trasnportation and communication cost 5% every 5 years.
- Increase of ship equipment cost 2% every 5 years.
- Increase of fresh water cost 5% every 5 years.
- Increase of port cost 5% every 5 years.
- Increase of administration cost 5% every 5 years.
- Increase of docking cost 10% every 5 years

Figure 4. 9 Cash flow ratio 2nd Scenario



From the figure above we could see that during lifetime the operation of ships PT B always incur losses. This is because the operational costs and income earned by PT B is not proportional

From Table 4. 22can be seen that earning after tax (EAT) obtained by PT IKI has been reduced and added again with the depreciation value of the ship. Meanwhile, on the Table 4. 23and Table 4. 24PT B and C are not charged by depreciation value because they do not have assets such a ships.

Based on the cashflow calculation of PT IKI with a discount rate of 10%, then the value of NPV obtained is Rp2.503.178.915,- with IRR 46%and Payback Period2,43 year. While, with the same discount rate (*i*) PT B get the value of NPV (Rp154.023.158.753,-) with IRR - and Payback Period -. And for PT C the value of NPV Rp181.615.766.211 with IRR – and Payback Period 1,38 year. As already discussed in the investment scenario that the discount rate will affect the value of NPV, IRR and Payback Period. So in this business scenario also will be discussed on the variation of the discount rate.Table 4. 19will explain the comparison of the difference in discount rate (*i*) on2nd business scenario.

This business scenario in the second scenario is therefore considered feasible for PT IKI as the owner of the ship and PT C but, it is not feasible for PT B as a charterer and the operator of the ship. Because NPV value of PT B is minus. To know the detail calculation profit and loss from 2nd scenario could be seen at Appendix 8.

Table 4. 21Comparison of Discount Rate (i) 2nd Secnario

(*i*)	PT IKI			PT B			PT C		
	NPV	**IRR**	**Payback Period**	**NPV**	**IRR**	**Payback Period**	**NPV**	**IRR**	**Payback Period**
10%	2.503.178.915,90	46%	2,43	(121.712.504.546,43)	-	-	153.790.496.352,66	-	-1,38
12%	34.586.670.529,87	44%	2,43	(80.347.505.620,25)	-	-	24.173.219.265,80	-	-4,10
15%	19.086.280.542,76	40%	2,43	(51.472.469.210,32)	-	-	68.506.417.760,28	-	1,13
18%	10.282.430.066,02	36%	2,43	(34.176.178.021,87)	-	-	47.640.972.258,22	-	1,13

Table 4. 22 Cash flow of PT IKI 2nd scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Depreciation	EBIT	Installment	EBT	Tax (15%)	EAT
0	1.800.000.000	(6.956.956.700)							(5.156.956.700)
1	4.240.000.000	(480.000.000)	3.760.000.000	1.391.391.340	2.368.608.660	1.052.625.000	1.315.983.660	197.397.549	2.509.977.451
2	4.532.000.000	(495.000.000)	4.037.000.000	1.391.391.340	2.645.608.660	953.625.000	1.691.983.660	253.797.549	2.829.577.451
3	4.846.600.000	(510.750.000)	4.335.850.000	1.391.391.340	2.944.458.660		2.944.458.660	441.668.799	3.894.181.201
4	5.185.730.000	(527.287.500)	4.658.442.500	1.391.391.340	3.267.051.160		3.267.051.160	490.057.674	4.168.384.826
5	5.551.496.500	(544.651.875)	5.006.844.625	1.391.391.340	3.615.453.285		3.615.453.285	542.317.993	4.464.526.632
6	5.946.199.325	(562.884,469)	5.383.314.856	463.900.000	4.919.414.856		4.919.414.856	737.912.228	4.645.402.628
7	6.372.350.091	(582.028.692)	5.790.321.399	463.900.000	5.326.421.399		5.326.421.399	798.963.210	4.991.358.189
8	6.832.692.476	(602.130.127)	6.230.562.349	463.900.000	5.766.662.349		5.766.662.349	864.999.352	5.365.562.997
9	7.330.224.468	(623.236.633)	6.706.987.834	463.900.000	6.243.087.834		6.243.087.834	936.463.175	5.770.524.659
10	7.868.222.796	(645.398.465)	7.222.824.331	463.900.000	6.758.924.331		6.758.924.331	1.013.838.650	6.208.985.681
11	8.450.269.751	(668.668.388)	7.781.601.363	463.900.000	7.317.701.363		7.317.701.363	1.097.655.204	6.683.946.158
12	9.080.282.635	(693.101.807)	8.387.180.828	463.900.000	7.923.280.828		7.923.280.828	1.188.492.124	7.198.688.704
13	9.762.546.103	(718.756.898)	9.043.789.206	463.900.000	8.579.889.206		8.579.889.206	1.286.983.381	7.756.805.825
14	10.501.747.679	(745.694.743)	9.756.052.936	463.900.000	9.292.152.936		9.292.152.936	1.393.822.940	8.362.229.996
15	11.303.016.760	(773.979.480)	10.529.037.280	463.900.000	10.065.137.280		10.065.137.280	1.509.770.592	9.019.266.688

NPV = Rp2.503.178.915,- ; IRR = 46% ; Payback Period = 2,43 year

Table 4. 23 Cashflow PT B 2nd Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	34.470.138.151	(18.912.955.367)	15.557.182.784	6.820.557.988	8.736.624.797	1.310.493.719	7.426.131.077
2	12.454.200.000	(21.625.606.656)	(9.171.406.656)	6.234.225.422	(15.405.632.078)		(13.094.787.266)
3	13.046.913.000	(19.618.807.244)	(6.571.894.244)	5.647.892.857	(12.219.787.101)		(10.386.819.035)
4	13.658.664.195	(22.842.835.569)	(9.184.171.374)		(9.184.171.374)		(7.806.545.668)
5	14.289.992.845	(20.955.493.620)	(6.665.500.775)		(6.665.500.775)		(5.665.675.659)
6	14.941.452.643	(24.557.211.143)	(9.615.758.500)		(9.615.758.500)		(8.173.394.725)
7	15.613.612.085	(22.428.104.258)	(6.814.492.173)		(6.814.492.173)		(5.792.318.347)
8	16.307.054.860	(26.060.135.886)	(9.753.081.027)		(9.753.081.027)		(8.290.118.873)
9	17.022.380.241	(24.016.478.167)	(6.994.097.926)		(6.994.097.926)		(5.944.983.237)
10	17.760.203.492	(28.085.676.554)	(10.325.473.062)		(10.325.473.062)		(8.776.652.103)
11	18.521.156.280	(25.855.318.812)	(7.334.162.531)		(7.334.162.531)		(6.234.038.151)
12	19.305.887.104	(27.858.005.275)	(8.552.118.171)		(8.552.118.171)		(7.269.300.445)
13	20.115.061.727	(32.415.018.564)	(12.299.956.837)		(12.299.956.837)		(10.454.963.311)
14	20.949.363.628	(30.183.120.296)	(9.233.756.668)		(9.233.756.668)		(7.848.693.168)
15	21.809.494.456	(27.858.005.275)	(6.048.510.819)		(6.048.510.819)		(5.141.234.196)

NPV = (Rp154.023.158.753,-) ; IRR = - ; Payback Period = -

Table 4. 24 Cash flow PT C 2nd Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	77.550.000.000	(65.010.000.000)	12.540.000.000	6.754.343.750	5.785.656.250	867.848.438	4.917.807.813
2	67.650.000.000	(59.347.200.000)	8.302.800.000	3.138.572.917	5.164.227.083	774.634.063	4.389.593.021
3	69.341.250.000	(60.643.308.000)	8.697.942.000		8.697.942.000	1.304.691.300	7.393.250.700
4	71.074.781.250	(61.969.005.120)	9.105.776.130		9.105.776.130	1.365.866.420	7.739.909.711
5	72.851.650.781	(63.324.988.884)	9.526.661.897		9.526.661.897	1.428.999.285	8.097.662.612
6	74.672.942.051	(64.711.973.622)	9.960.968.429		9.960.968.429	1.494.145.264	8.466.823.164
7	76.539.765.602	(66.130.690.879)	10.409.074.723		10.409.074.723	1.561.361.208	8.847.713.515
8	78.453.259.742	(67.581.889.836)	10.871.369.906		10.871.369.906	1.630.705.486	9.240.664.420
9	80.414.591.236	(69.066.337.742)	11.348.253.494		11.348.253.494	1.702.238.024	9.646.015.470
10	82.424.956.017	(70.584.820.355)	11.840.135.661		11.840.135.661	1.776.020.349	10.064.115.312
11	84.485.579.917	(72.138.142.397)	12.347.437.520		12.347.437.520	1.852.115.628	10.495.321.892
12	86.597.719.415	(73.727.128.012)	12.870.591.403		12.870.591.403	1.930.588.710	10.940.002.692
13	88.762.662.400	(75.352.621.249)	13.410.041.151		13.410.041.151	2.011.506.173	11.398.534.979
14	90.981.728.960	(77.015.486.542)	13.966.242.418		13.966.242.418	2.094.936.363	11.871.306.056
15	93.256.272.184	(78.716.609.214)	14.539.662.970		14.539.662.970	2.180.949.446	12.358.713.525

NPV = Rp181.615.766.211 ; IRR = - ; Payback Period = 1,38 year

4.6.3 3rd Scenario

This thirdscenario would discuss the relation between PT IKI as the owner of KM Mina Jaya Niaga with PT B as an operator of KM Mina Jaya Niaga, and PT C as a third party who will do a repair and conversion of KM Mina Jaya Niaga, also who will be charter KM Mina Jaya Niaga to PT IKI. Table 4. 25will explains each expense that has to be paid by PT IKI, PT B and PT C.

Table 4. 25 3rd Scenario

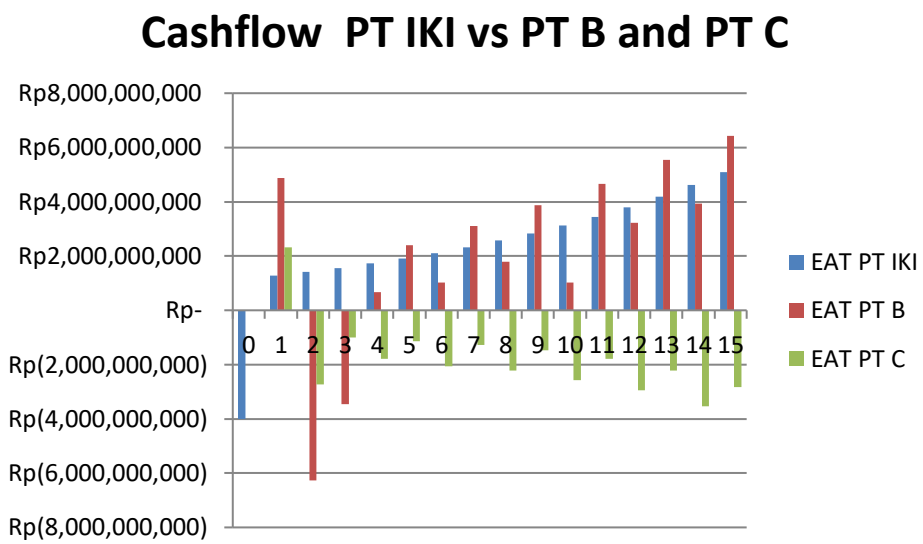
Item	PT. IKI	PT. B	PT. C	Fisherman	Fish Trader
- Investment	x	x	v	x	x
- Ship ownership	v	x	x	x	x
- Working Capital	x	v	x	x	x
- Maintenance	x	x	v	x	x
- Fish Selling	x	v	x	x	x
- Fish Purchasing	x	v	x	x	x
- Fixed Cost (except maintenance)	x	v	x	x	x
- Voyage Cost (except administration of ship)	x	v	x	x	x
- Additional Cost	x	v	x	x	x

From the table above, it can be seen that PT IKI as ship owners do not need to pay anything except the cost of licensing administration ship (SIKPI) and ship prices depreciated value. Then, the revenue of PT IKI is obtained from the chartered cost of KM Mina Jaya Niaga. Ship charterred cost received by PT IKI amounting to Rp1.600.000.000, - in the first year and will continue to increase 10% in every year, during the lease period of 15 years. For details of cash flow from PT IKI can be seen on Table 4. 26.

PT C as a charterer is obliged to pay the cost of repair and conversion of KM Mina Jaya Niaga, maintenance per year and also pay the charterred cost of KM Mina Jaya Niaga to PT IKI. Meanwhile, PT B as the operator of KM Mina Jaya will operate the Mina Jaya KM. The revenue obtained by PT B will be done by profit sharing with PT C, just like the previous scenario. This

can be seen from the ratio of income obtained by each company, as seen inFigure 4. 10.

Figure 4. 10 Cash flow ratio 3rd Scenario



From the figure above can be seen that PT C as a charterer of the ship suffered losses during the operational time KM Mina Jaya Niaga as a fish carrier ship. This is because unbalance between revenue and expenditure incurred by PT C as a boat charterer.

Revenue and expenditure that earned by PT IKI, PT B and PT C has increase and decrease in each year . This is due to several assumptions, such as:

- Increase crew salary 2,5% every year.
- Increase fuel price 2% every year.
- Increase maintenance cost 5% every year.
- Increase ABF contribution 5% every year.
- Increase cold storage contribution 5% every year.
- Increase selling price of fish 2,5% every year.
- Increase purchasing of fish 1,5% every year.
- Increase of sailing fee 5% every years.
- Increase of loading-unloading cost 5% every 5 years.
- Increase of retribution cost 5% every 5 years.
- Increase of ship equipment 2,5% every 5 years.
- Increase of trasnportation and communication cost 5% every 5 years.
- Increase of ship equipment cost 2% every 5 years.
- Increase of fresh water cost 5% every 5 years.
- Increase of port cost 5% every 5 years.

- Increase of administration cost 5% every 5 years.
- Increase of docking cost 10% every 5 years

From the Table 4. 26can be seen earning after tax (EAT) obtained by PT Iki has included the depreciation of ship prices. PT IKI is not charged for installment fee because it does not borrow capital from the bank. While in the Table 4. 27and Table 4. 28earning after tax (EAT) each company has incurred a reduction of the cost of intallment in accordance with the loan amount of each company, but PT B and PT C are not subject to depreciation charges because they have no assets such as ships.

Based on the cashflow calculation of PT. IKI with a discount rate (*i*)of 10%, then the value of NPV is Rp16.927.335.004,- with IRR 28% and Payback Period3,09 year. While, with the same discount rate (*i*) PT B get the value of NPV Rp47.733.249,- with IRR 10% and Payback Period6,01 year. And for PT C the value of NPV (Rp9.006.124.206,-). As already discussed in the investment scenario that the discount rate will affect the value of NPV, IRR and Payback Period. So in this business scenario also will be discussed on the variation of the discount rate.Table 4. 29will explain the comparison of the difference in discount rate (*i*) on3rd business scenario.

In this third scenario the results are feasible for PT IKI and PT B with discount rate (*i*) 10%, but not feasible for PT C. For details of profit and loss calculations of PT IKI, PT B and PT C in 3rd scenario can be seen in Appendix 9.

Table 4. 26 Cash flow PT IKI 3rd Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Depreciation	EBIT	Tax (15%)	EAT
0		(4.000.000.000)					(4.000.000.000)
1	1.600.000.000	(180.000.000)	1.420.000.000	463.900.000	956.100.000	143.415.000	1.276.585.000
2	1.760.000.000	(180.000.000)	1.580.000.000	463.900.000	1.116.100.000	167.415.000	1.412.585.000
3	1.936.000.000	(180.000.000)	1.756.000.000	463.900.000	1.292.100.000	193.815.000	1.562.185.000
4	2.129.600.000	(180.000.000)	1.949.600.000	463.900.000	1.485.700.000	222.855.000	1.726.745.000
5	2.342.560.000	(180.000.000)	2.162.560.000	463.900.000	1.698.660.000	254.799.000	1.907.761.000
6	2.576.816.000	(180.000.000)	2.396.816.000	463.900.000	1.932.916.000	289.937.400	2.106.878.600
7	2.834.497.600	(180.000.000)	2.654.497.600	463.900.000	2.190.597.600	328.589.640	2.325.907.960
8	3.117.947.360	(180.000.000)	2.937.947.360	463.900.000	2.474.047.360	371.107.104	2.566.840.256
9	3.429.742.096	(180.000.000)	3.249.742.096	463.900.000	2.785.842.096	417.876.314	2.831.865.782
10	3.772.716.306	(180.000.000)	3.592.716.306	463.900.000	3.128.816.306	469.322.446	3.123.393.860
11	4.149.987.936	(180.000.000)	3.969.987.936	463.900.000	3.506.087.936	525.913.190	3.444.074.746
12	4.564.986.730	(180.000.000)	4.384.986.730	463.900.000	3.921.086.730	588.163.009	3.796.823.720
13	5.021.485.403	(180.000.000)	4.841.485.403	463.900.000	4.377.585.403	656.637.810	4.184.847.592
14	5.523.633.943	(180.000.000)	5.343.633.943	463.900.000	4.879.733.943	731.960.091	4.611.673.852
15	6.075.997.337	180.000.000)	5.895.997.337	463.900.000	5.432.097.337	814.814.601	5.081.182.737

NPV = Rp16.927.335.004,- ; IRR = 28% ; Payback Period = 3,09 years

Table 4. 27 Cash flow PT B 3rd Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	81.945.888.151	(71.192.486.823)	10.753.401.328	6.820.557.988	3.932.843.341	589.926.501	3.342.916.840
2	67.650.000.000	(67.685.713.593)	(35.713.593)	6.234.225.422	(6.269.939.016)		(6.269.939.016)
3	69.341.250.000	(67.467.458.390)	1.873.791.610	5.647.892.857	(3.774.101.247)		(3.774.101.247)
4	71.074.781.250	(70.400.154.426)	674.626.824		674.626.824	101.194.024	573.432.800
5	72.851.650.781	(70.432.158.003)	2.419.492.778		2.419.492.778	362.923.917	2.056.568.861
6	74.672.942.051	(73.636.504.367)	1.036.437.684		1.036.437.684	155.465.653	880.972.031
7	76.539.765.602	(73.413.431.354)	3.126.334.248		3.126.334.248	468.950.137	2.657.384.111
8	78.453.259.742	(76.657.272.457)	1.795.987.285		1.795.987.285	269.398.093	1.526.589.192
9	80.414.591.236	(76.504.959.169)	3.909.632.066		3.909.632.066	586.444.810	3.323.187.256
10	82.424.956.017	(80.827.322.475)	1.597.633.542		1.597.633.542	239.645.031	1.357.988.511
11	84.485.579.917	(79.779.195.245)	4.706.384.672		4.706.384.672	705.957.701	4.000.426.971
12	86.597.719.415	(83.343.903.253)	3.253.816.162		3.253.816.162	488.072.424	2.765.743.738
13	88.762.662.400	(83.173.283.805)	5.589.378.596		5.589.378.596	838.406.789	4.750.971.806
14	90.981.728.960	(87.007.584.489)	3.974.144.471		3.974.144.471	596.121.671	3.378.022.800
15	93.256.272.184	(86.768.412.836)	6.487.859.348		6.487.859.348	973.178.902	5.514.680.446

NPV = Rp47.733.249,- ; IRR = 10% ; Payback Period = 6,01 year

Table 4. 28 Cash flow PT C 3rd Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	7.168.934.219	(1.600.000.000)	5.568.934.219	1.052.625.000	4.516.309.219	677.446.383	3.838.862.836
2	(23.809.062)	(1.760.000.000)	(1.783.809.062)	953.625.000	(2.737.434.062)		(2.737.434.062)
3	1.249.194.406	(1.936.000.000)	(686.805.594)		(686.805.594)		(686.805.594)
4	449.751.216	(2.129.600.000)	(1.679.848.784)		(1.679.848.784)		(1.679.848.784)
5	1.612.995.185	(2.342.560.000)	(729.564.815)		(729.564.815)		(729.564.815)
6	690.958.456	(2.576.816.000)	(1.885.857.544)		(1.885.857.544)		(1.885.857.544)
7	2.084.222.832	(2.834.497.600)	(750.274.768)		(750.274.768)		(750.274.768)
8	1.197.324.857	(3.117.947.360)	(1.920.622.503)		(1.920.622.503)		(1.920.622.503)
9	2.606.421.377	(3.429.742.096)	(823.320.719)		(823.320.719)		(823.320.719)
10	1.597.633.542	(3.772.716.306)	(2.175.082.764)		(2.175.082.764)		(2.175.082.764)
11	3.137.589.781	(4.149.987.936)	(1.012.398.155)		(1.012.398.155)		(1.012.398.155)
12	2.169.210.775	(4.564.986.730)	(2.395.775.955)		(2.395.775.955)		(2.395.775.955)
13	3.726.252.397	(5.021.485.403)	(1.295.233.006)		(1.295.233.006)		(1.295.233.006)
14	2.649.429.647	(5.523.633.943)	(2.874.204.296)		(2.874.204.296)		(2.874.204.296)
15	4.325.239.565	(6.075.997.337)	(1.750.757.772)		(1.750.757.772)		(1.750.757.772)

NPV = (Rp9.006.124.206,-) ; IRR = - ; Payback Period = -

Table 4. 29Comparison of Discount Rate (i) 3rd Secnario

(*i*)	PT IKI			PT B			PT C		
	NPV	**IRR**	**Payback Period**	**NPV**	**IRR**	**Payback Period**	**NPV**	**IRR**	**Payback Period**
10%	16.927.335.004	28%	3,14	47.733.249	10%	6,01	(9.006.124.206)	-	-
12%	9.919.642.973	25%	3,14	(1.551.618.094)	-	-	(5.327.444.791)	-	-
15%	3.703.150.186	22%	3,14	(2.418.728.818)	-	-	(2.085.842.363)	-	-
18%	344.026.865	19%	3,14	(2.449.518.199)	-	-	(182.063.616)	-	-

4.6.4 4th Scenario

This fourthscenario would discuss the relation between PT IKI as the owner of KM Mina Jaya Niaga with PT B as an operator of KM Mina Jaya Niaga, PT C as a third party who will do a repair and conversion of KM Mina Jaya Niaga, also who will be charter KM Mina Jaya Niaga to PT IKI. Bakul Ikan will do selling and purchasing of fish, and fisherman who will pay the cost of its own fuel. Table 4. 30will explains each expense that has to be paid by PT IKI, PT B, PT C, Fish Trader and Fisherman.

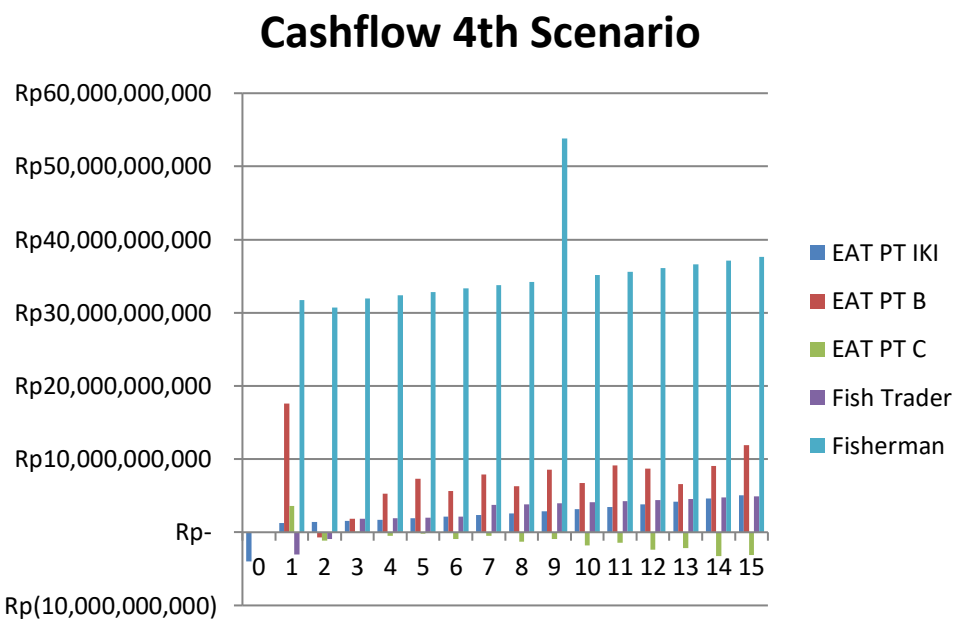
Table 4. 30 4th Scenario

Item	PT. IKI	PT. B	PT. C	Fisherman	Fish Trader
- Investment	x	x	v	x	x
- Ship ownership	v	x	x	x	x
- Working Capital	x	v	x	x	x
- Maintenance	x	x	v	x	x
- Fish Selling	x	x	x	x	v
- Fish Purchasing	x	x	x	x	v
- Fixed Cost (except maintenance)	x	v	x	x	x
- Voyage Cost	x	v	x	x	x
- Additional Cost	x	v	x	x	x
- Fuel	x	v	x	v	x

From the table above, it can be seen that PT IKI as ship owners do not need to pay anything except the cost of licensing administration ship (SIKPI) and ship prices depreciated value.PT C as a charterer is obliged to pay the cost of repair and conversion of KM Mina Jaya Niaga, maintenance per year and also pay the charterred cost of KM Mina Jaya Niaga to PT IKI. Meanwhile, PT B as the operator of KM Mina Jaya will operate the Mina Jaya KM.For the cost of purchasing and selling fish will be covered by Baku Ikan. Later proceeds from the selling of fish by Bakul Ikan will do a profit sharing with PT B, with a ratio of 90% for PT B and 10% for Bakul Ikan. Sharing of profit given to PT B is larger than Bakul Ikan, because it is proportional to the cost incurred by PT B. Furthermore, fisherman will finance the cost of purchasing their own fuel so that the expenditure of PT

B for fuel costs is reduced.This can be seen from the ratio of income obtained by each company, as seen inFigure 4. 11.

Figure 4. 11 Cash flow ratio 4th Scenario



From the figure above can be seen that PT C suffered losses starting from year 6 until the end of the operational year. Inversely withfish trader that in the year 0 to year 2 suffered a loss and began to earn profits in the 3rd year. To know the revenue and expenditure of PT IKI, PT B, PT C, Bakul Ikan and fisherman can be seen onTable 4. 31, Table 4. 32, Table 4. 33, Table 4. 34, and Table 4. 35.

From each table below we can see thatrevenue and expenditure that earned by PT IKI, PT B, PT C, Bakul Ikan and fisherman has increase and decrease in each year . This is due to several assumptions, such as:

- Increase crew salary 2,5% every year.
- Increase fuel price 2% every year.
- Increase maintenance cost 5% every year.
- Increase ABF contribution 5% every year.
- Increase cold storage contribution 5% every year.
- Increase selling price of fish 2,5% every year.
- Increase purchasing of fish 1,5% every year.
- Increase of sailing fee 5% every years.
- Increase of loading-unloading cost 5% every 5 years.

- Increase of retribution cost 5% every 5 years.
- Increase of ship equipment 2,5% every 5 years.
- Increase of trasnportation and communication cost 5% every 5 years.
- Increase of ship equipment cost 2% every 5 years.
- Increase of fresh water cost 5% every 5 years.
- Increase of port cost 5% every 5 years.
- Increase of administration cost 5% every 5 years.
  Increase of docking cost 10% every 5 years

Based on the cashflow calculation of PT IKI, PT B, PT C, fish trader and fisherman have known value of NPV, IRR and Payback Period with discount rate 10%. As already discussed in the investment scenario that the discount rate will affect the value of NPV, IRR and Payback Period. So in this business scenario also will be discussed on the variation of the discount rate.Table 4. 36will explain the comparison of the difference in discount rate (*i*) on4th business scenario.

As can be seen from the cashfow table below, if viewed from the value of NPV, IRR and Payback Period then in business scenario 4th is declared feasible for all parties. Although at PT C had suffered a loss but still feasible for this investment. For the detail calculation profit and loss in this 4thscenario can be seen on Appendix 10.

Table 4. 31 Cash flow PT IKI 4th Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Depreciation	EBIT	Tax (15%)	EAT
0		(4.000.000.000)					(4.000.000.000)
1	1.600.000.000	(180.000.000)	1.420.000.000	463.900.000	956.100.000	143.415.000	1.276.585.000
2	1.760.000.000	(180.000.000)	1.580.000.000	463.900.000	1.116.100.000	167.415.000	1.412.585.000
3	1.936.000.000	(180.000.000)	1.756.000.000	463.900.000	1.292.100.000	193.815.000	1.562.185.000
4	2.129.600.000	(180.000.000)	1.949.600.000	463.900.000	1.485.700.000	222.855.000	1.726.745.000
5	2.342.560.000	(180.000.000)	2.162.560.000	463.900.000	1.698.660.000	254.799.000	1.907.761.000
6	2.576.816.000	(180.000.000)	2.396.816.000	463.900.000	1.932.916.000	289.937.400	2.106.878.600
7	2.834.497.600	(180.000.000)	2.654.497.600	463.900.000	2.190.597.600	328.589.640	2.325.907.960
8	3.117.947.360	(180.000.000)	2.937.947.360	463.900.000	2.474.047.360	371.107.104	2.566.840.256
9	3.429.742.096	(180.000.000)	3.249.742.096	463.900.000	2.785.842.096	417.876.314	2.831.865.782
10	3.772.716.306	(180.000.000)	3.592.716.306	463.900.000	3.128.816.306	469.322.446	3.123.393.860
11	4.149.987.936	(180.000.000)	3.969.987.936	463.900.000	3.506.087.936	525.913.190	3.444.074.746
12	4.564.986.730	(180.000.000)	4.384.986.730	463.900.000	3.921.086.730	588.163.009	3.796.823.720
13	5.021.485.403	(180.000.000)	4.841.485.403	463.900.000	4.377.585.403	656.637.810	4.184.847.592
14	5.523.633.943	(180.000.000)	5.343.633.943	463.900.000	4.879.733.943	731.960.091	4.611.673.852
15	6.075.997.337	(180.000.000)	5.895.997.337	463.900.000	5.432.097.337	814.814.601	5.081.182.737

NPV = Rp16.927.335.004 ; IRR = 28% ; Payback Period = 3,09 year

Table 4. 32 Cash flow PT B 4th Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Interest	EBT	Tax (15%)	EAT
0							
1	43.875.138.151	(16.375.871.924)	27.499.266.227	6.820.557.988	20.678.708.240	3.101.806.236	17.576.902.004
2	18.681.300.000	(13.302.778.925)	5.378.521.075	6.234.225.422	(855.704.347)	(128.355.652)	(727.348.695)
3	19.570.369.500	(11.723.222.999)	7.847.146.501	5.647.892.857	2.199.253.644	329.888.047	1.869.365.598
4	20.487.996.293	(14.331.059.588)	6.156.936.705		6.156.936.705	923.540.506	5.233.396.199
5	21.434.989.268	(12.852.633.704)	8.582.355.564		8.582.355.564	1.287.353.335	7.295.002.230
6	22.412.178.964	(15.768.395.760)	6.643.783.204		6.643.783.204	996.567.481	5.647.215.724
7	23.420.418.127	(14.102.548.548)	9.317.869.579		9.317.869.579	1.397.680.437	7.920.189.142
8	24.460.582.289	(17.048.775.678)	7.411.806.611		7.411.806.611	1.111.770.992	6.300.035.620
9	25.533.570.361	(15.457.731.602)	10.075.838.759		10.075.838.759	1.511.375.814	8.564.462.946
10	26.640.305.238	(18.760.372.992)	7.879.932.246		7.879.932.246	1.181.989.837	6.697.942.409
11	27.781.734.421	(17.026.894.038)	10.754.840.383		10.754.840.383	1.613.226.057	9.141.614.325
12	28.958.830.656	(18.741.746.250)	10.217.084.406		10.217.084.406	1.532.562.661	8.684.521.745
13	30.172.592.591	(22.449.519.926)	7.723.072.664		7.723.072.664	1.158.460.900	6.564.611.765
14	31.424.045.441	(20.730.223.629)	10.693.821.813		10.693.821.813	1.604.073.272	9.089.748.541
15	32.714.241.684	(18.741.746.250)	13.972.495.434		13.972.495.434	2.095.874.315	11.876.621.119

NPV = Rp169.260.604.504,- ; IRR = - ; Payback Period = 0,28 year

Table 4. 33 Cash flow PT C 4th Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	6.874.816.557	(1.600.000.000)	5.274.816.557	1.052.625.000	4.222.191.557	633.328.734	3.588.862.823
2	1.344.630.269	(1.760.000.000)	(415.369.731)	953.625.000	(1.368.994.731)	(205.349.210)	(1.163.645.521)
3	1.961.786.625	(1.936.000.000)	25.786.625		25.786.625	3.867.994	21.918.631
4	1.539.234.176	(2.129.600.000)	(590.365.824)		(590.365.824)	(88.554.874)	(501.810.950)
5	2.145.588.891	(2.342.560.000)	(196.971.109)		(196.971.109)	(29.545.666)	(167.425.443)
6	1.660.945.801	(2.576.816.000)	(915.870.199)		(915.870.199)		(915.870.199)
7	2.329.467.395	(2.834.497.600)	(505.030.205)		(505.030.205)		(505.030.205)
8	1.852.951.653	(3.117.947.360)	(1.264.995.707)		(1.264.995.707)		(1.264.995.707)
9	2.518.959.690	(3.429.742.096)	(910.782.406)		(910.782.406)		(910.782.406)
10	1.969.983.062	(3.772.716.306)	(1.802.733.244)		(1.802.733.244)		(1.802.733.244)
11	2.688.710.096	(4.149.987.936)	(1.461.277.841)		(1.461.277.841)		(1.461.277.841)
12	2.145.912.698	(4.564.986.730)	(2.419.074.031)		(2.419.074.031)		(2.419.074.031)
13	2.857.711.585	(5.021.485.403)	(2.163.773.818)		(2.163.773.818)		(2.163.773.818)
14	2.243.631.379	(5.523.633.943)	(3.280.002.564)		(3.280.002.564)		(3.280.002.564)
15	2.996.004.514	(6.075.997.337)	(3.079.992.824)		(3.079.992.824)		(3.079.992.824)

NPV = Rp3.178.197.949,- ; IRR = 5% ; Payback Period = 5,96 year

Table 4. 34 Cash flow Bakul Ikan 4th Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	77.550.000.000	(74.415.000.000)	3.135.000.000	6.754.343.750	(3.619.343.750)	(542.901.563)	(3.076.442.188)
2	67.650.000.000	(65.574.300.000)	2.075.700.000	3.138.572.917	(1.062.872.917)	(159.430.938)	(903.441.979)
3	69.341.250.000	(67.166.764.500)	2.174.485.500		2.174.485.500	326.172.825	1.848.312.675
4	71.074.781.250	(68.798.337.218)	2.276.444.033		2.276.444.033	341.466.605	1.934.977.428
5	72.851.650.781	(70.469.985.307)	2.381.665.474		2.381.665.474	357.249.821	2.024.415.653
6	74.672.942.051	(72.182.699.944)	2.490.242.107		2.490.242.107	373.536.316	2.116.705.791
7	76.539.765.602	(72.182.699.944)	4.357.065.658		4.357.065.658	653.559.849	3.703.505.810
8	78.453.259.742	(73.937.496.921)	4.515.762.821		4.515.762.821	677.364.423	3.838.398.398
9	80.414.591.236	(75.735.417.265)	4.679.173.970		4.679.173.970	701.876.096	3.977.297.875
10	82.424.956.017	(77.577.527.862)	4.847.428.154		4.847.428.154	727.114.223	4.120.313.931
11	84.485.579.917	(79.464.922.101)	5.020.657.816		5.020.657.816	753.098.672	4.267.559.143
12	86.597.719.415	(81.398.720.537)	5.198.998.878		5.198.998.878	779.849.832	4.419.149.046
13	88.762.662.400	(83.380.071.564)	5.382.590.836		5.382.590.836	807.388.625	4.575.202.211
14	90.981.728.960	(85.410.152.112)	5.571.576.848		5.571.576.848	835.736.527	4.735.840.321
15	93.256.272.184	(87.490.168.356)	5.766.103.829		5.766.103.829	864.915.574	4.901.188.254

NPV = Rp21.129.671.774,- ; IRR = 30% ; Payback Period = 3,96 year

Table 4. 35 Cash flow Fisherman 4th Scenario (Rupiah)

Year	Revenue	Expenditure	EBITDA	Installment	EBT	Tax (15%)	EAT
0							
1	48.000.000.000	(9.600.000.000)	38.400.000.000	1.052.625.000	37.347.375.000	5.602.106.250	31.745.268.750
2	46.893.000.000	(9.792.000.000)	37.101.000.000	953.625.000	36.147.375.000	5.422.106.250	30.725.268.750
3	47.596.395.000	(9.987.840.000)	37.608.555.000		37.608.555.000	5.641.283.250	31.967.271.750
4	48.310.340.925	(10.187.596.800)	38.122.744.125		38.122.744.125	5.718.411.619	32.404.332.506
5	49.034.996.039	(10.391.348.736)	38.643.647.303		38.643.647.303	5.796.547.095	32.847.100.207
6	49.770.520.979	(10.599.175.711)	39.171.345.269		39.171.345.269	5.875.701.790	33.295.643.478
7	50.517.078.794	(10.811.159.225)	39.705.919.569		39.705.919.569	5.955.887.935	33.750.031.634
8	51.274.834.976	(11.027.382.409)	40.247.452.567		40.247.452.567	6.037.117.885	34.210.334.682
9	52.043.957.501	11.247.930.058	63.291.887.558		63.291.887.558	9.493.783.134	53.798.104.425
10	52.824.616.863	(11.472.888.659)	41.351.728.204		41.351.728.204	6.202.759.231	35.148.968.974
11	53.616.986.116	(11.702.346.432)	41.914.639.684		41.914.639.684	6.287.195.953	35.627.443.732
12	54.421.240.908	(11.936.393.361)	42.484.847.547		42.484.847.547	6.372.727.132	36.112.120.415
13	55.237.559.522	(12.175.121.228)	43.062.438.294		43.062.438.294	6.459.365.744	36.603.072.550
14	56.066.122.914	(12.418.623.652)	43.647.499.262		43.647.499.262	6.547.124.889	37.100.374.373
15	56.907.114.758	(12.666.996.125)	44.240.118.633		44.240.118.633	6.636.017.795	37.604.100.838

NPV = Rp12.947.106296,- ; IRR = - ; Payback Period = 0,47 year

Table 4. 36 Comparison of Discount Rate (i) 4th Secnario

(*i*)	PT IKI			PT B			PT C		
	NPV	IRR	Payback Period	NPV	IRR	Payback Period	NPV	IRR	Payback Period
10%	16.927.335.004	28%	3,14	139.884.797.110	-	0,28	2.626.609.875	5%	5,96
12%	9.919.642.973	25%	3,14	107.164.714.356	-	0,22	3.603.205.495	3%	5,50
15%	3.703.150.186	22%	3,14	75.348.926.187	-	0,22	4.110.568.647	1%	5,50
18%	344.026.865	19%	3,14	55.666.353.669	-	0,22	4.079.585.461	-2%	5,50

Fish Trader			Fisherman		
NPV	IRR	Payback Period	NPV	IRR	Payback Period
17.462.538.656	30%	3,96	657.328.542.816	-	0,47
10.258.823.360	28%	3,52	494.131.626.895	-	0,37
4.091.764.395	24%	3,52	336.423.397.174	-	0,37
946.711.007	21%	3,52	239.911.996.090	-	0,37

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CHAPTER 5
Conclusions and Recommendation

5.1 Conclusions

Based on the analysis of this research study which refer to data analysis results and others information, then some conclusions could be taken as explained below :

1. Operational scenario from KM Mina Jaya Niaga, this fish carrier ship will be operated on WPP-RI 716 with home based port at PP Bitung. KM Mina Jaya will accommodate fish obtained from fishing vessels of with50 GT on 4 fishing ground with estimated time for 1 voyage 18,92 hours, loading-unloading at PP Bitung 1 day, and time to berth at port 4 days. So, operational time for KM Mina Jaya Niaga is 6 days. That means within 1 month KM Mina Jaya Niaga will do 5 voyage.
2. In this thesis, some variable financing scenarios are performed to repair, modify and re-operate KM Mina Jaya Niaga as a fish carrier ship. Among them are self-funded by PT IKI as the owner of the vessel or joint funding with several parties as can be seen in each business scenario in Chapter 4.5.
3. If viewed from an economic point of view, the conversion of KM Mina Jaya Niaga from longliner ship to fish carrier ship is feasible and can be a very profitable business.

5.2 Recommendation

From the analysis that has been done on this thesis, then as a writer I recommend to do repair and conversion on KM Mina Jaya Niaga Longliner ship to fish carrier ship. In addition to being a profitable business for the company owner KM Mina Jaya Niaga, this can also benefit many parties, one of which is the fisherman. With the operation of the KM Mina Jaya Niaga as a fish carrier ship, allowing fisherman to sell fish and fishing again without having to sell to fishing port or market.

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Bibliography

[1] (PT PANN) PT Pengembangan Armada Niaga Nasional, "Penjelasan Alur Proyek Pembiayaan Kapal Ikan Minajaya," PT. PANN, Presentation 2016.

[2] Edward , "Kualitas Perairan Teluk Ambon".

[3] Daniel Parenden, "Perencanaan Cold Storage Pada Ruang Palka Kapal Ikan ARUJAYA 30 GT," *Jurnal Ilmiah Mustek Anim HA*, vol. 1 No. 2, pp. 66 - 68, Agustus 2012.

[4] Budi Nugraha and Enjah Rahmat, *Status Perikanan Huhate (Pole and Line) di Bitung, Sulawesi Utara*, Mei 2008.

[5] I Soeharto, *Manajemen Proyek (dari konseptual hingga operasional) Bagian II : Kelayakan Proyek dan Keputusan Investasi*. Jakarta: Erlangga, 2001.

[6] Grasiano Warakano Lailossa, "Model Cold Chain System Untuk Strategi Peningkatan Kualitas Ekspor Tuna, Tongkol, Cakalang (TTC)," Institut Teknologi Sepuluh Nopember, Surabaya, Disertasi 2017.

[7] Sub Directorate of Data and Statistics of Capture Fisheries, Ed., *Statistics of Marine Capture Fisheries By Fisheries Management Area (FMA), 2005 - 2015*.: Directorate General of Capture Fisheries, 2016.

[8] *Buku Diktat Kuliah Sekolah Tinggi Perikanan Teknologi Penangkapan Ikan*. Jakarta, 2017.

[9] Masyhuri Hamidi, "Internal Cash Flows, Insider Ownership, Investment Opportunity, dan Capital Expenditures : Suatu Pengujian Terhadap Hipotesis Pecking Order dan Managerial," *Jurnal ekonomi dan Bisnis Indonesia*, vol. 18, No.3, pp. 271-287, 2003.

[10] *Maritime Economics*, 3rd ed.

[11] PT. Indsutri Kapal Indonesia (Persero), "Spesifikasi Teknis KM Mina Jaya Niaga," Makassar,.

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Appendix 1

CAPITAL EXPENDITURE OF KM MINA JAYA NIAGA

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Appendix 2

CALCULATION OF DISTANCE AND TIME OPERATIONAL SCENARIO

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Appendix 3

DETAIL CALCULATION OF CREDIT INSTALLMENT

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Appendix 4

REVENUE AND PRODUCTION BASED ON SEASON

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Appendix 5

TOTAL OPERATIONAL EXPENDITURE

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Appendix 6

CALCULATION PROFIT AND LOSS

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Appendix 7

CALCULATION PROFIT AND LOSS 1ST BUSINESS SCENARIO

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Appendix 8

CALCULATION PROFIT AND LOSS 2ND BUSINESS SCENARIO

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Appendix 9

CALCULATION PROFIT AND LOSS 3RDBUSINESS SCENARIO

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Appendix 10

CALCULATION PROFIT AND LOSS 4TH BUSINESS SCENARIO

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Nyimas Safira Amalia was born in Surabaya, Jawa Timur, Indonesia on January 10, 1995 and the second of two children. She attended formal education in SD Muhammadiyah 4 Surabaya, SMPN 19 Surabaya, SMA Muhammadiyah 2 Surabaya and pursuing a bachelor degree in Marine Engineering at Institut Teknologi Sepuluh Nopember (ITS). At the time of college study, the authorparticipated in the Marine Engineering Students Association at ITS (HIMASISKALITS) as a staff External Affairs 2015 - 2016 period.The author also participated in big event on ITS Surabaya as a staff of Public Relation YES Summit 2014, as an expert staff of Public Relation YES Summit 2015, as an expert staff of Sponsorship ITS EXPO 2015.The author also had the opportunity to do a research study on RAMS Laboratory. Besides college the author also worked part time as radio announcer at EBS FM.